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Construction of Machinery Foundations

Concrete and Other Types for Both Large and Small Machines, Including Heavy Steel-Works Steam Engines

BY ARTHUR CONNLEY

The steel plant contains machines and prime-movers of many kinds and sizes. Most of these are held to elevation and alignment by masonry foundations set in the ground. Additions to and changes in the plant are constantly being made and it is seldom that a machine or prime mover foundation is not under construction. The experience that the engineering department has had in the design and construction of such foundations has been very comprehensive.

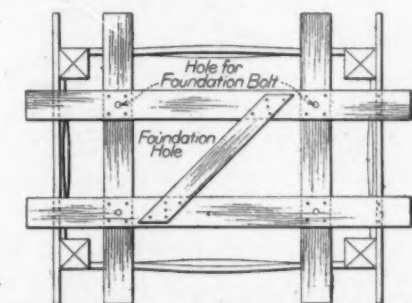
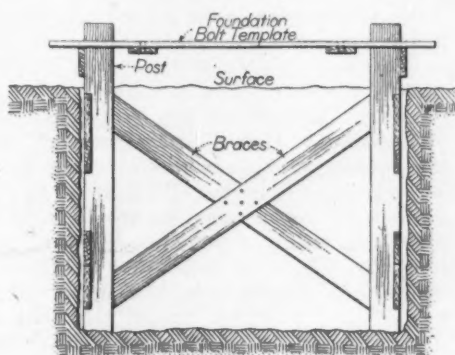


Fig. 1—Template Support for Foundation in Self-Supporting Soil

It is the purpose of this article to outline some of the practices that have been developed and that have, in a sense, become standard for foundation construction in the plant.

In designing a foundation for a given application, one of the first things to be considered is the dead weight that the foundation must support. This weight consists of that of the machine to be supported and that of the foundation itself. The area of base of the foundation must be sufficiently great that the pressure imposed by it on the soil will not be excessive. Safe pressures per square foot for different kinds of soil are given in Kidder's "Architects' and Builders' Handbook." The soil in different parts of the works varies greatly from made or filled-in ground to hard clay. The pressures per square foot that foundations are allowed to impress vary accordingly. The mini-

mum is 1 ton per square foot, while the maximum is about 4 tons per square foot.

The weight or mass of a foundation is a factor to be considered. It should be sufficient to prevent lateral movement of the supported machine. The weight of a foundation for a self-contained machine that does not vibrate to any extent, such as a motor-generator, need not necessarily be great. If the foundation is sufficiently large to include

the foundation bolts of the machine and sufficiently deep to extend to good bottom, possibly 3, 4 or 5 ft., its weight if it is solid will usually be more than ample and the foundation can be hollowed out in the center as hereinafter described. But for

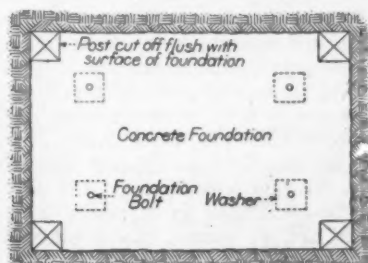


Fig. 2—Plan of Foundation with Posts Imbedded

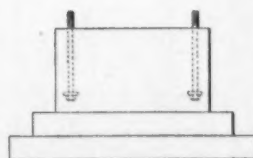
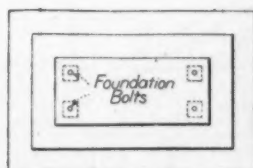


Fig. 3—Small Foundation with Extended Base

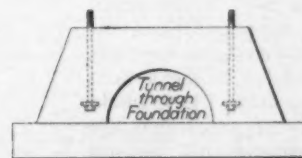
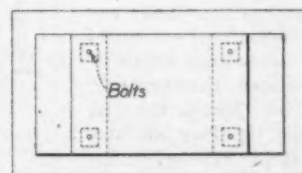


Fig. 4—Foundation Hollowed Out to Save Concrete

a foundation for some machine, such as a steam engine, which tends to vibrate excessively, considerable mass is necessary to maintain the machine accurately in position. The weight necessary for a foundation is a thing that must be determined by an experienced designer. It is not possible to give a rule that will answer for every case. The usual practice is to design a foundation tentatively so that it will include the foundation bolts, extend to good bottom and provide sufficient area of base to maintain the pressure on the soil at a safe value. Then weight can be added to or taken from this tentative foundation as deemed necessary by the designer.

Builders of engines and some other machines furnish

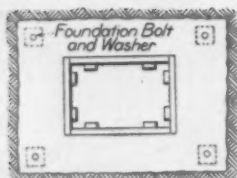


Fig. 5—Foundation with a Hollow Center

build a foundation and put it into service between Saturday noon and Sunday night, it is made of brick set in a 1:3 cement mortar. A concrete foundation is cheaper than one of brick. Masonry (stone, and mortar) foundations are seldom, if ever, used.

Drawings are usually prepared by the engineering department indicating the exact location of each foundation and "tying it in" with some part of a building or with an existing foundation. An engineer determines the location in the field with a transit and he fixes the line and elevation of the templet that supports and locates the foundation bolts.

Forms, obviously, are not required for brick foundations. For concrete ones, where forms are used, they are constructed in the field so as to provide a foundation of the dimensions indicated by the drawing furnished by the engineering department. An engineer with a transit assists the carpenters in locating the forms for large foundations. Where the soil is stiff enough to be self-sustaining and the foundation is a simple one, forms can be dispensed with. A hole, Fig. 1, is excavated to the dimensions of the foundation and is filled with concrete. The dirt sides of the hole constitute the form. Posts are erected in each corner of the hole, to support the bolt templet and are held in position with braces. The posts and braces are left in the foundation as suggested in the plan view of Fig. 2 and are, of course, sawed off flush with its top.

The shapes of all foundations are made as simple as possible, so that the forms for them can be readily made. Figs. 3 and 4 show examples of small foundations which illustrate this practice. The foundation of Fig. 3 has an extended base to maintain the pressure on the soil within a safe value. If the prism containing the foundation bolts were extended to the bottom its area of base would be so small that the pressure on the soil would be excessive. Hence the necessity of extending the base as shown. A hollow arch runs entirely through the foundation of Fig. 4. The space within the arch represents an equal volume of concrete saved. Such a saving is possible in foundations that would, without the arch, be heavier than necessary to prevent vibration of the

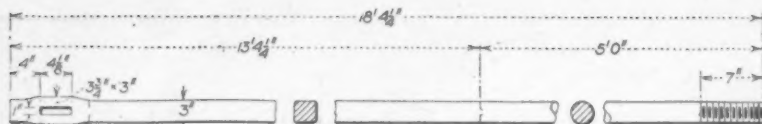


Fig. 7—Foundation Bolt of Square Billet for Large Engine

machinery supported.

In Fig. 5 is illustrated another method of saving concrete in foundations. In this, a box shaped form is centered in the middle of the excavation and the volume within the box represents saved concrete.

Foundation bolt templets are necessary in the construction of all foundations to retain the bolts in their correct positions while the concrete is being poured in and is setting. A simple templet for four bolts is shown in Fig. 1, mounted in correct position over the foundation. The bolts hang through the holes in the templet and are held up by the nuts, which turn on their upper ends. Small templets are made of, possibly, 7/8-in. boards and are completed in the carpenter shop. They are aligned and leveled over the foundation by careful measurements. An engineer's transit is frequently used in this work. Some sort of a sturdy support is always required for a templet. In the arrangement of Fig. 1, stringers across posts set in the foundation hold the templet. Frequently templets are supported on stringers nailed to stakes driven in the ground near the foundation hole and sometimes they are supported on the form.

A larger templet is shown in Fig. 6 (the illustration is not to scale), which indicates a method rather than a specific example. This scheme may be used for the very largest foundations. Heavy timber stringers are laid across the foundation hole, with their ends resting in depressions of such depth that the bottom face of the templet will be at the elevation of the top face of the foundation. The stringers carry the templet, which, in turn, carries the foundation bolts. For a large foundation requiring bolts possibly 2 in. in diameter the weight of the bolts will be considerable and the stringers must be so disposed that the templet, which is usually of relatively light stock, will not be subjected to excessive stresses. For heavy bolts the stringers should be near the rows of bolt holes rather than midway between them as suggested in Fig. 6.

Where a templet is to be supported as outlined in Fig. 6, it may be built complete in the carpenter shop, if it is not too large, and then be transported to the foundation hole and located on the stringers. If the foundation is large, possibly 60 or 100 ft. long, for an engine or other big machine it is necessary to build the templet in the field. In building a big templet the carpenters work under the directions of an

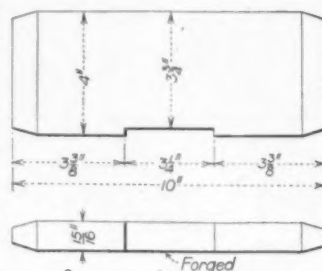


Fig. 8—Key for Bolt of Fig. 7

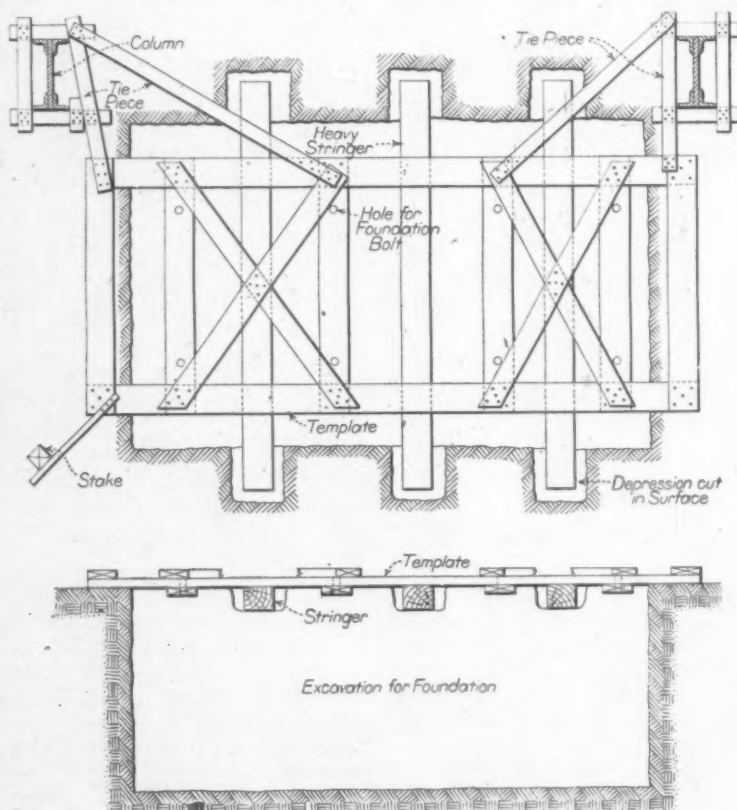


Fig. 6—One Method of Supporting a Large Templet

engineer with a transit. The engineer works from the foundation drawing which accurately locates all foundation bolts. The stringers are laid first and fixed solidly in position, and then the templet is built, piece by piece, by fastening planks to the stringers in the right positions and boring therein the foundation bolt holes at the proper points. The points of location of the holes are determined by the engineer and his assistants.

If the templet is made in one piece in the shop, as indicated in Fig. 6, it can be held in correct location by wooden tie pieces, each nailed to the templet at one end and made fast to a stake or to a member of the building at the other end. Whether made in shop or not, outside bracing is always used on large templets, wherever possible. The drawings prepared for all foundations of

For foundation washers for the lower ends of the bolts, crop ends of rail, which are always obtainable about the plant, are frequently used in small foundations, as shown in Fig. 9. A hole is punched through the web of the rail and a head or hook is formed on the bolt, at its lower end, which transmits the stress from the bolt to the washer. For large foundations, square, cast iron washers, Fig. 10, cast from special patterns are used. The washer of Fig. 10 is for the bolt of Fig. 7. The hole in the washer is rectangular in shape, to accommodate the flattened part at the lower end of the bolt. The flat face of the washer "looks toward" the top of the foundation. The key, Fig. 8, bears against the seat on the lower face of the washer.

A finished steel washer, like that of Fig. 11, is fre-

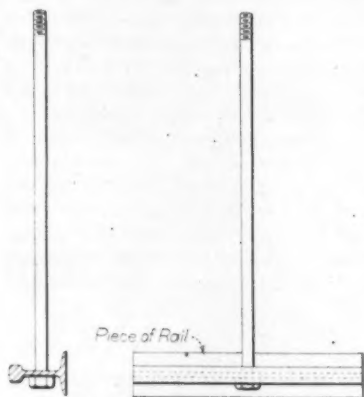


Fig. 9—Piece of Rail for Foundation Washer

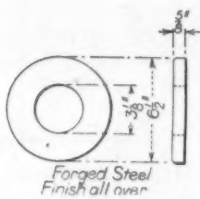


Fig. 11—Washer for Upper End of Bolt

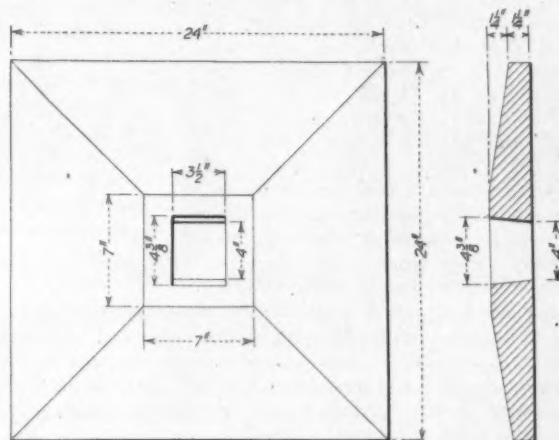


Fig. 10—Cast-iron Washer for a Large Foundation

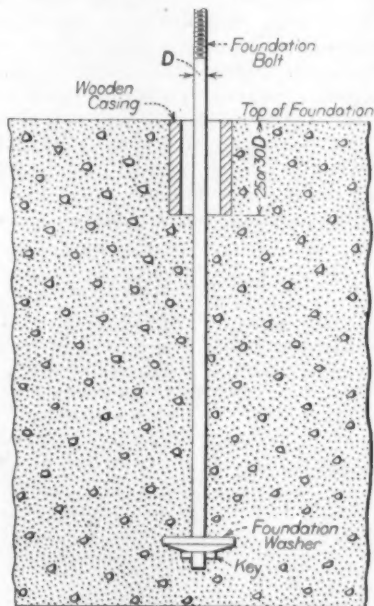


Fig. 12—Casing Set in Foundation



Fig. 13—Wooden Casing

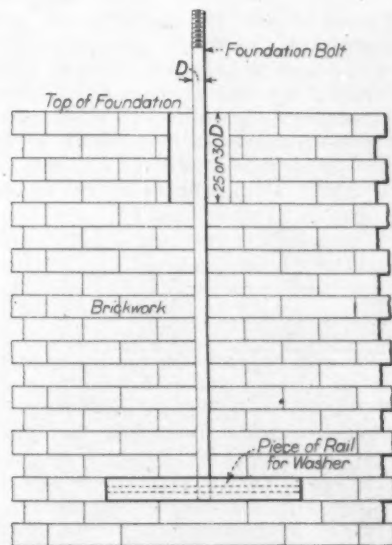


Fig. 14—Free Space Formed with Bricks

any consequence by the engineering department, give all of the dimensions of the foundation and locate the bolts so that a carpenter can readily construct a templet for a small foundation by taking his dimensions from the drawing.

For foundation bolts ordinary mild steel round rod is usually used for the smaller foundations. The rod is threaded at both ends for nuts. For larger bolts a square billet, Fig. 7, is used, because the stock is rolled in the plant. The upper end of the rod is forged to a round section and threaded for a nut. At the lower end the rod is flattened out for a distance and slotted for a key, Fig. 8, which bears against the foundation washer. It is cheaper to flatten the end of the rod and punch the slot in it than to forge it round and thread it. The bolt of Fig. 7 and the key of Fig. 8 were used in the foundation for a 44 x 84-in. and 84 x 84-in. vertical compound blowing engine.

quently used under the nut at the upper end of a foundation bolt, to provide a smooth seat for the nut to turn on.

Foundation bolts are usually set solid in the foundations, except for a relatively short distance, equal to, possibly, 25 or 30 bolt diameters, near the top of the foundation. See Fig. 12. This free space is allowed so that the upper end of the bolt can be shifted a little, if necessary, to get it into the hole in the machine bed plate. Bolt holes in bed plates are usually cored and may not, therefore, always be located accurately in accordance with the machine builder's drawings. In concrete foundations the free space about the upper end of the bolt is obtained by setting a box-like casing, or form, similar to that of Fig. 13, around the bolt before the concrete is poured. In brick foundations the free space is formed with the bricks, as indicated in Fig. 14.

Sometimes foundations are so arranged that the bolts will be removable. When so arranged there is a free

space about the bolt for its entire length. The foundations of Fig. 15 have free spaces the entire lengths of the bolts. The usual practice in the plant is to so proportion the bolts that there will be practically no possibility of their breaking. Hence it is practically never necessary to replace a bolt, and the rule is to build bolts in solid, rather than to make them removable.

An example of a large engine foundation is shown in Fig. 15. The foundation is for a 50 x 78 x 60-in. horizontal tandem-compound engine driving a bloom mill. The foundation bolts are removable from this foundation. The washers are of cast iron and each has a pocket cored in it, in which a standard nut rests, Fig. 16. Each bolt is a $3\frac{1}{2}$ in. mild steel rod threaded at both ends and pointed at the lower end.

The purpose of the design of this foundation was to permit the extremely heavy bed plate to be placed in position without the difficulty usually experienced in lowering such a heavy casting down to place over high foundation bolts. In a foundation of this type the bolts are usually dropped through the bed plate and into the foundation, and screwed into the nuts in the foundation bolt washers, after the bed plate is in place. However, in this particular case the foundation was built with the bolts in place.

An interesting feature of this foundation is that part of an old foundation and the foundation bolts therein were utilized for the support of the back bearing of the engine. A special back bearing bed plate was built which was arranged to take the old bolts and such new ones as were necessary. The old bolts were cut off and re-threaded to fit. One inch was allowed, in designing the foundation, for grouting between the foundation top and the lower edges of the engine bed plate. A similar allowance is always made with foundations, so that a perfect bedding of the bed plate will be assured. The grouting space is usually filled with a cement mortar, which is

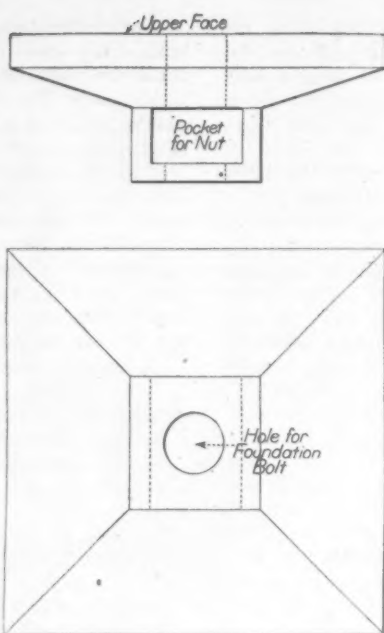


Fig. 16—Foundation Washer with Nut Pocket

poured in at about the consistency of thick cream. This grout fills the space completely, so that no matter how uneven the bottom of the bed plate or the top of the foundation, there will be a perfect union between them at all points. A drain was cast in the foundation from the bottom of the fly wheel pit to an adjacent sewer, to carry away any oil and water that might collect in it.

In the case of a concrete foundation for a 46 and 86, 84 and 84 x 60-in. vertical blowing engine, square steel bolts similar to that shown in Fig. 7 were used. All of the bolts were forged from 3-in. square billets. A 6-in. square space was provided at each bolt location, which was filled with grout after the bolts were in position, and engine mounted and aligned. A $\frac{3}{4}$ -in. space was allowed between the upper face of the foundation and the lower edge of the bed plate for grouting, but instead of a cement grout, a rust joint was formed. The rust joint was made by rusting cast-iron chips, with

sal ammoniac, into one mass between the bed plate and foundation.

The foreign commerce of the United States made a new and remarkable record in the fiscal year ended June 30. The total value of the merchandise entering and leaving the country in its trade with foreign lands and its own island possessions in the fiscal year 1912 was \$4,000,000,000; the value of manufactures exported was more than \$1,000,000,000, and the value of non-dutiable merchandise entering the country was \$1,000,000,000. The value of duty-free merchandise entering from foreign countries in 1912 not only exceeds by far that of any earlier year, but also forms a larger share of the total imports than in any previous years except 1892 and 1894, the opening and closing years of the operations of the McKinley law, when the imports of sugar free of duty were abnormally large.

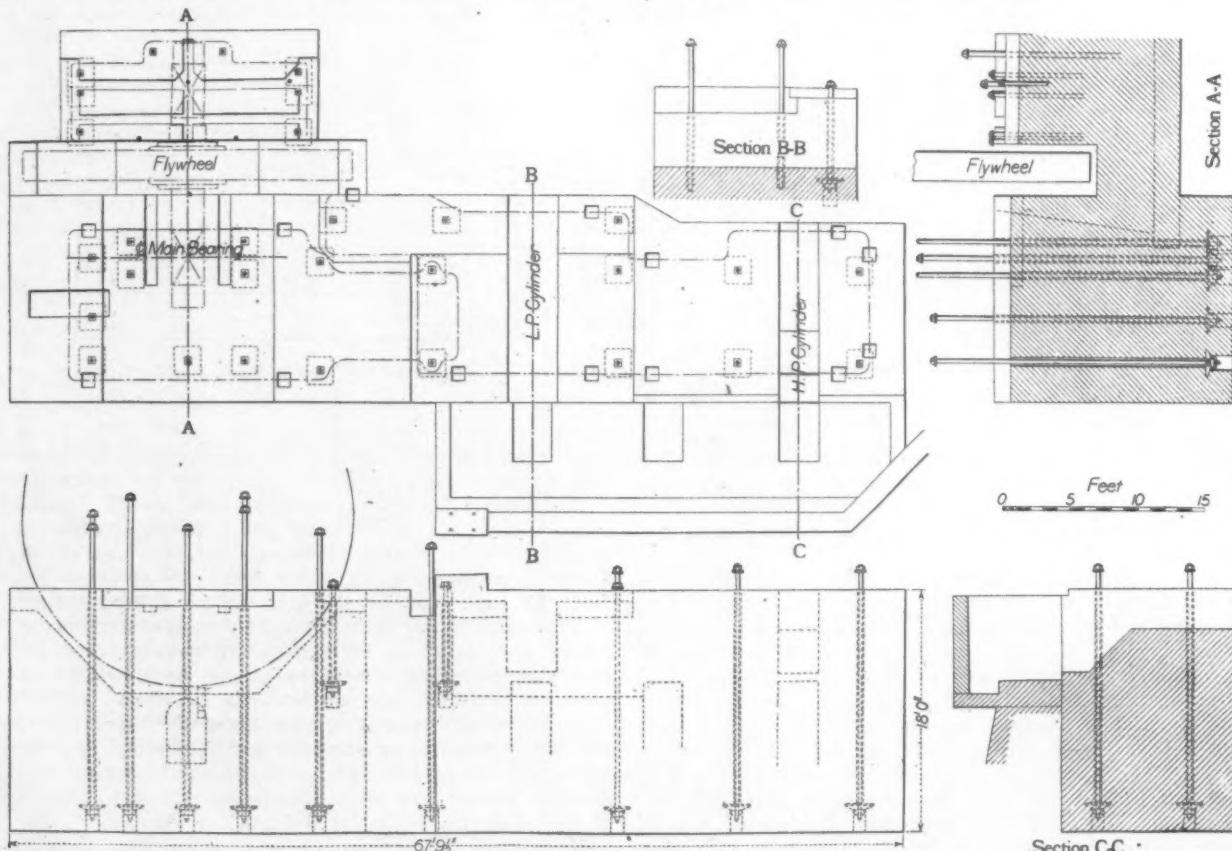


Fig. 15—Concrete Foundation for a 50 x 78 x 60-in. Horizontal Tandem-Compound Engine

Workmen's Daily Time Slips A Method That Insures Accuracy and Saves Time in Filling Them Out

Observations extending over a period of years regarding actual practice in the average shop as to the filling out of daily "time slips" by the workmen have emphasized at least two important considerations. The first is waste of time and the second, inaccuracies. It is the custom in many shops, particularly among the men doing floor or bench work, to fill out time slips in the last five minutes before the whistle blows at night. It is not an unusual sight at that time to find a number of men waiting for a pencil or a place at an available writing space, all intent on making out their time before the whistle blows. With the form of time slip ordinarily in use and the provisions for distribution, it is difficult to prevent this borrowing of company time, although the aggregate waste in a large shop is surprising. On the other hand, the machine operator who fills out his slip from time to time through the day makes it the occasion for a good deal of lingering between jobs.

The more important consideration is the one of ac-

DAILY TIME SLIP

LOCATION NO. 34

DAY.....✓.....

NAME..James Hogan

NIGHT.....

DATE..Feby. 10, 1910.

OVERTIME...✓...

WORK ASSIGNED.

Ord. No. 364 Turning Car Brasses

No. 372 Turning Car Axles

No. 373 Finishing Pistons

Time	Order No.	Time	Order No.	Time	Order No.	Time	Order No.
6:30	9:30	.....	12:30	.....	3:30	.....
6:45	9:45	.....	12:45	.....	3:45	.....
7:00	10:00	.....	1:00	.....	4:00	.....
7:15	364	10:15	.....	1:15	.....	4:15	.....
7:30	10:30	.....	1:30	.....	4:30	.....
7:45	10:45	.....	1:45	.....	4:45	.....
8:00	11:00	.....	2:00	.....	5:00	.....
8:15	11:15	.....	2:15	.....	5:15	.....
8:30	11:30	.....	2:30	372	5:30	.....
8:45	11:45	.....	2:45	.....	5:45	.....
9:00	12:00	.....	3:00	.....	6:00	.....
9:15	12:15	.....	3:15	.....	6:15	373

TOTAL TIME..10¼..

RATE..27½..

SIGNED..G. H. Harris,

FOREMAN

curacy. In numerous instances elaborate cost keeping systems depend for the figures of distribution of time among various orders upon the time slip record made out by the workman. More often than otherwise the workman undertakes to recall at the end of the day at about what time one job was finished and another begun, and the result is a guess that may or may not be a close one. There are now on the market automatic registering devices in which the workman is required to punch his time card at the completion of each job, with the result that the time is marked thereon. But such an installation is somewhat expensive.

To meet the conditions indicated, a simple form of time slip illustrated herewith was devised. The day was divided into 15-minute periods. Shorter intervals might have been used. Every machine in the shop was numbered and every space for bench and floor work. At a convenient place, hung on the building columns or bracketed on the operator's machine, small writing boards were placed, each numbered in accordance with the location and with a pencil attached. Some time during the day previous, the foreman's boy filled in on the slip the number, the workman's name and the date, corresponding to the last slip turned in. The

foreman then entered on the slip the assignment for the following day. Immediately after quitting time the boy, who was paid at the rate of 12½ cents an hour, distributed these slips, fastening them on the corresponding writing boards throughout the shop and collecting the slips of the current day.

Under this system the workman was not required to give any time or attention to the time card. His assignment was before him and all he was required to do on completing a job was to enter up the order number opposite the time. Three clocks were placed in the shop in such positions that every one could see the time without leaving his place. At the end of the day the order number of the work upon which the employee was then engaged was entered on the time slip, whether complete or not, as a check on the day's work, the reappearance of the same number on the following or a subsequent date being in itself evidence of the carrying over of the job. This form of time card was intended to be in keeping with the simplest of shop card systems and at the same time to offer every opportunity for time saving and accurate distribution of labor. Its form and the manner of numbering each location offered advantages in connection with other features of the shop's system, but these were incidental to the principal object.

Coal Merger Proposed at Pittsburgh

One of the largest corporations to be organized in Pittsburgh in many years is shortly to be given active form through the efforts of New York financiers, says the Pittsburgh Post. It involves the merger of five of the largest independent coal mining companies operating in the Pittsburgh seam, and will have a capital and bond issue of \$50,000,000 and an annual production of coal of 10,000,000 tons, with an unmined area of 40,000 acres. Financially it will be one of the strongest coal mining companies in the United States.

The five companies that are included in this move are the United Coal Company, Pittsburgh & Westmoreland Coal Company, Pittsburgh-Buffalo Company, Youghiogheny & Ohio Fuel Company and Carnegie Coal Company. With these companies will go several subsidiary corporations, such as the Carnegie Dock Company, with storage docks on Lake Superior, supply companies and other adjuncts of large coal mining operations.

The organization of the new corporation will be built on a stock issue of \$25,000,000 and a bond issue of a like sum. The largest of the individual interests to be absorbed in this new company will be the plant and properties of the Pittsburgh & Westmoreland Coal Company, with some 20,000 acres of coking coal land, and a capacity of 4,000,000 tons a year production and with 500,000 tons annually of coke production.

The fact that much coking coal is included in the properties lends additional significance to the proposed merger, two of the companies having coke plants at the present time and others being in shape to build coke plants and produce a good grade of furnace coke with such coal as they are now mining. The Pittsburgh & Westmoreland Coal Company's holdings are almost entirely of a high grade coking coal, and its coke plant is one of the most modern as well as most economical of operation in the Pittsburgh territory.

The fact that the old Connellsville basin coal is rapidly approaching a point of exhaustion is adding to the possibilities of this company. The new company would hold the next adjoining coking coal to that region.

At the annual meeting of stockholders of the Brier Hill Coke Company held last week, the following were elected: H. H. Stambaugh, president; R. C. Steese, vice-president; John Tod, treasurer; Thomas McCaffrey, secretary. The Redstone Central Railroad Company elected the following: Joseph G. Butler, Jr., president; John Tod, vice-president; Thomas McCaffrey, secretary and treasurer. Both these companies are subsidiaries of the Brier Hill Steel Company, Youngstown, Ohio.

The Punxsutawney Iron Company, operating a blast furnace at Punxsutawney, Pa., has filed a notice of an increase in its capital stock from \$150,000 to \$300,000.

An Arrangement for Casting Small Ingots

A Method Devised for Their Production in Large Quantities, as Employed at Two European Steel Plants

Much has been said on the subject of using small ingots to supply merchant mills, rod mills and tire mills with the necessary raw material; but up to a short time ago nothing had been devised to enable manufacturers to do so. George Marton, consulting engineer, Budapest, Hungary, claims to have solved the problem, and in an economical way, as described below. The article from which the illustrations and data are taken appeared in *Stahl und Eisen*, Vol. 31, No. 47, and is written from the standpoint of the inventor.

In rolling $\frac{1}{4}$ to $\frac{1}{2}$ -in. rods from two-ton to six-ton ingots, it is pointed out that unnecessary work is done. The very expensive installation of a blooming mill is needed, for running which intelligent and high-priced labor is required; on the other hand small ingots can be cast easily and economically. In most cases, it is stated, the failure to use small ingots is only because methods now in use for ingot casting are too expensive and not suited for large output. Works which are already equipped for casting small ingots, it is believed, will be interested in the new method, since in a small space a large quantity can be cheaply cast, the men not being exposed to undue heat and the ingots being sent hot to the rolling mills.

By Mr. Marton's method small ingots are bottom cast in batteries on a common bottom plate, from a common fountain. The method of casting and of removing the ingots from the runners is not much different from what is now in use, but the method of handling the molds is entirely new.

At the Kropf steel works at Resicza, Hungary, and at Falvahütte in Upper Silesia an arrangement is employed whereby several rows of molds—in fact, all that are on one bottom plate—can be lifted from the ingots without other labor than that of the crane operator, whereas it formerly took several men to do the work from a much less convenient position.

The arrangement and operation of the lifting device

are shown in Figs. 1, 2 and 3. The hook-shaped ear of the mold is fastened into a recess on its side by means of a key, so that when the mold is scrapped the ear and key can be used again. The method of suspending the series of molds (from five to seven in a row) makes it possible to hang them up to cool by the same crane that strips the ingots. The number of molds which can be handled by one suspension frame depends on the size of the ingots. For example, of 8 in. x 8-in. ingots 49 molds can be handled; of $5\frac{1}{2}$ x $5\frac{1}{2}$ -in. ingots 63 molds can be handled—in both cases including the fountain. Fig. 4 shows an arrangement in use at Kropf, where the molds are manipulated in such a manner that after a short lift the crane

moves forward and throws the molds with their ingots sidewise, thus breaking the runners. Complete batteries can be handled in this manner.

It is also desirable to bring the small ingots hot to the rolling mills, to make use of their initial heat in the same manner as with large ingots. To load the ingots quickly and to keep their heat longer, the bottom plate is provided with a wall on three sides, as in Figs. 3 and 5, and the ingots can be dumped into a car (Fig. 5) by a single movement.

After the ingots have been brought to the rolling mills, it is best to deposit them in deep pits. These are not heated but the ingots, on account of lying together in a large mass, keep their high temperature for several hours. They are charged by means of a crane which lifts them out of the pits. Where local conditions permit, it is preferable to bring the ingots with their bottom plate to the rolling mill and dump them directly into soaking pits. It is suggested that the bottom plate freed from its ingots be not directly returned to the casting pit but be placed at one side to prepare it for the next charge. By this method not only increased production can be reached but the men who brick the bottom plates are not compelled to work in the vicinity of the hot molds. Fig. 6 shows a cross-

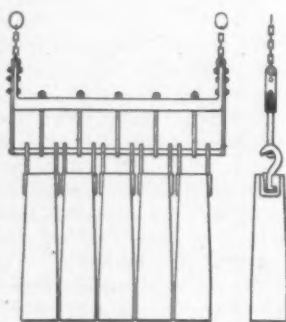


Fig. 1—Lifting Device with Steel Hooks

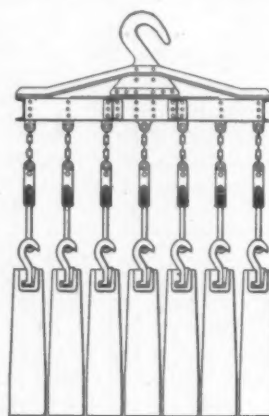


Fig. 2—Method of Using Lifting Device

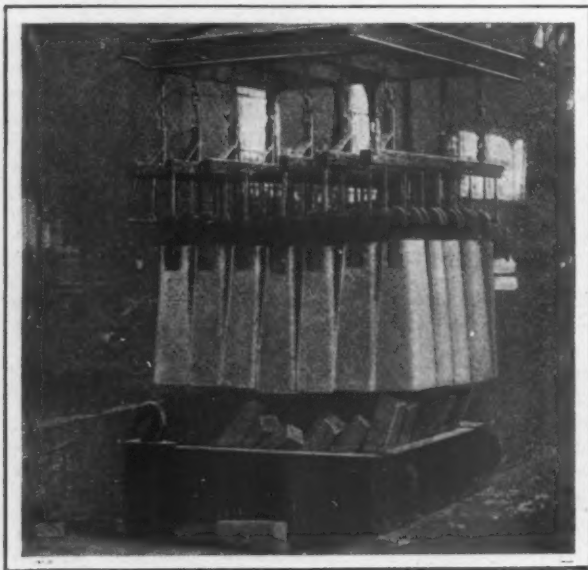


Fig. 3—Lifting a Battery of Ingots



Fig. 5—Unloading Ingots Into a Car

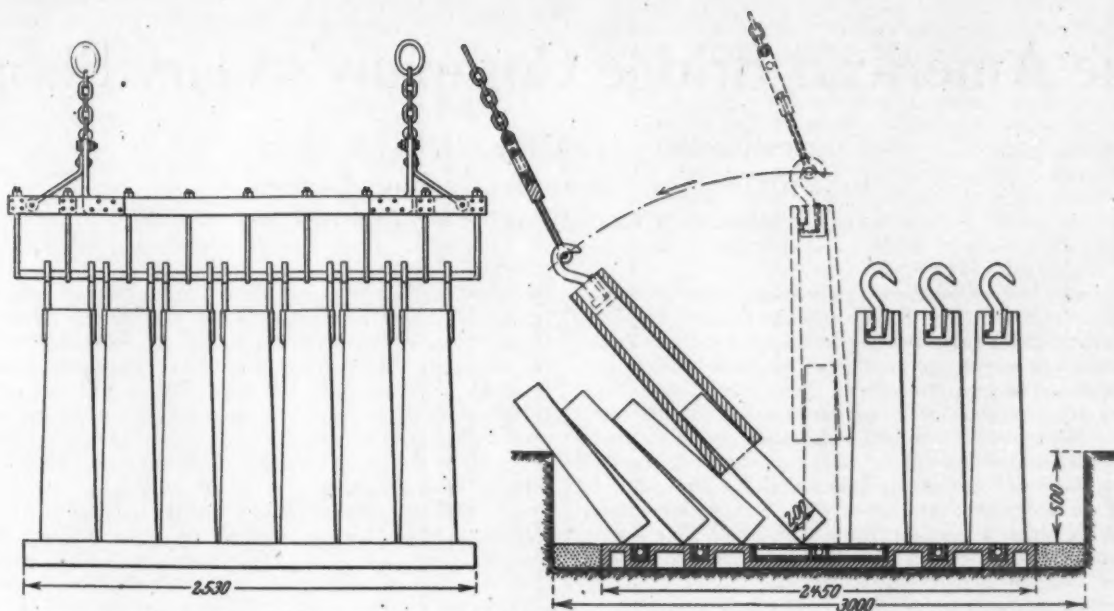


Fig. 4—Method of Manipulation at Krumpach, Doing Away with the Shearing Operation—Dimensions in Millimeters

section of the casting pit of the steel department at Resicza.

The advantages the inventor claims for his method are summarized as follows: 1. Double the production can be reached in the same space in the pit. 2. Less labor, as a large part of the work is done mechanically. 3. The men work under much better conditions as they are not compelled to work near the hot ingots and molds. 4. Order can be better preserved, as the molds after stripping remain in regular rows in their cooling place. 5. The bottom plates suffer less, as the hot mass of steel is more rapidly removed from them. 6. The ingots are brought to the rolling mills hot; thus the output of the mill can be greatly increased and the consumption of coal and the wear on reheating furnaces greatly decreased. 7. It is possible to cast economically such small ingots as 5 in. x 5½ in. 150 lb. to 220 lb., the production of which in large amounts has been extremely difficult hitherto.

Coal Purchases Under Specifications

Manufacturers and others who use coal in considerable quantity will be interested in Bulletin 41, of the United States Bureau of Mines, on "Government Coal Purchases Under Specifications." This bulletin, which was prepared by George S. Pope, engineer in charge of fuel inspection

for the Government, is the fourth of a series showing the results of such purchases. Its purpose is to explain in general terms the methods that the Government has found most satisfactory for the purchase of a large part of its coal supply, including the consideration of bids, the awarding of contracts and the analyzing of samples on which the price corrections are based.

For the information of prospective bidders on Government contracts a list of the coal contracts in force in the fiscal year ended June 30, 1911, is furnished. General averages of the analyses during the fiscal year 1908 to 1910, inclusive, are tabulated for the various sizes of anthracite and also for the several kinds of bituminous coal purchased for Government use, and the results for the fiscal year ended June 30, 1910, are shown in detail by months. Copies may be obtained by addressing the Director of the Bureau of Mines, Washington, D. C.

The Pittsburgh Steamship Company has placed an order with the American Shipbuilding Company for a large steel steamer of the Isherwood type to be used in the ore trade. It will be a duplicate of the steamer James A. Farrell, which was ordered last February. It will be 600 ft. long, 58 ft. beam and 32 ft. deep, will have a capacity of 12,000 tons and will be delivered at the opening of navigation in 1913.

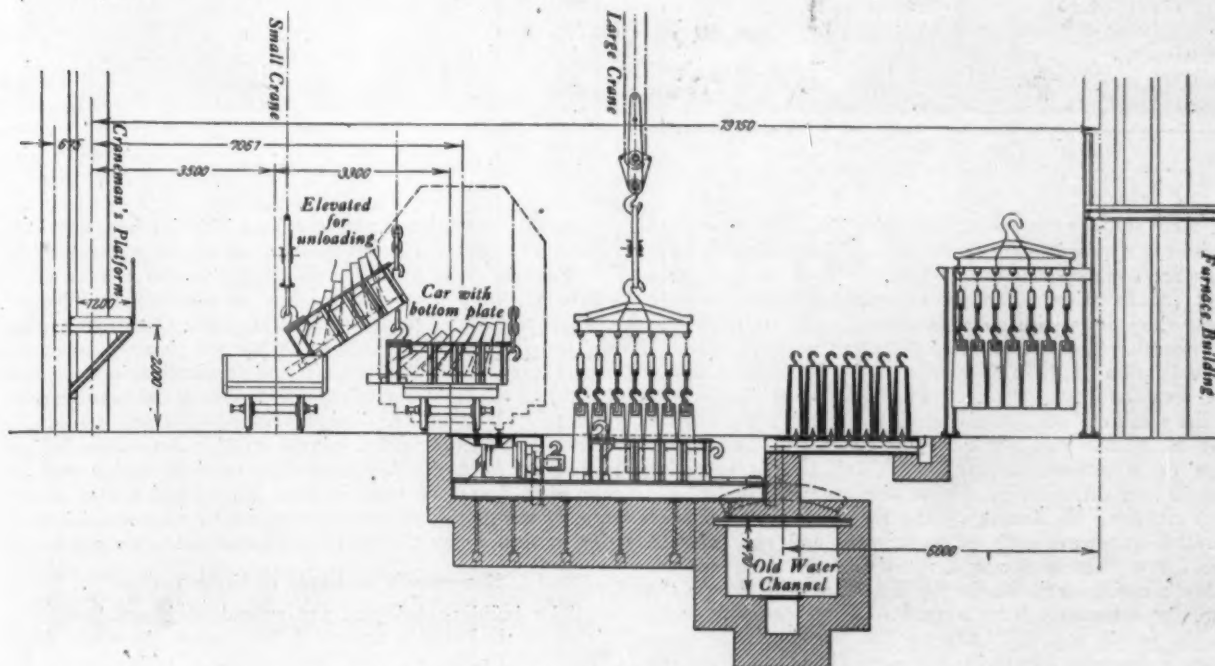


Fig. 6—Cross Section of Casting Pit at Resicza, Austria-Hungary

The American Bridge Company's Gary Shops

**Fabricating Shops Designed in Large Units
to Provide for Plant Extension—Cranes
and Railways a Large Factor in Operation**

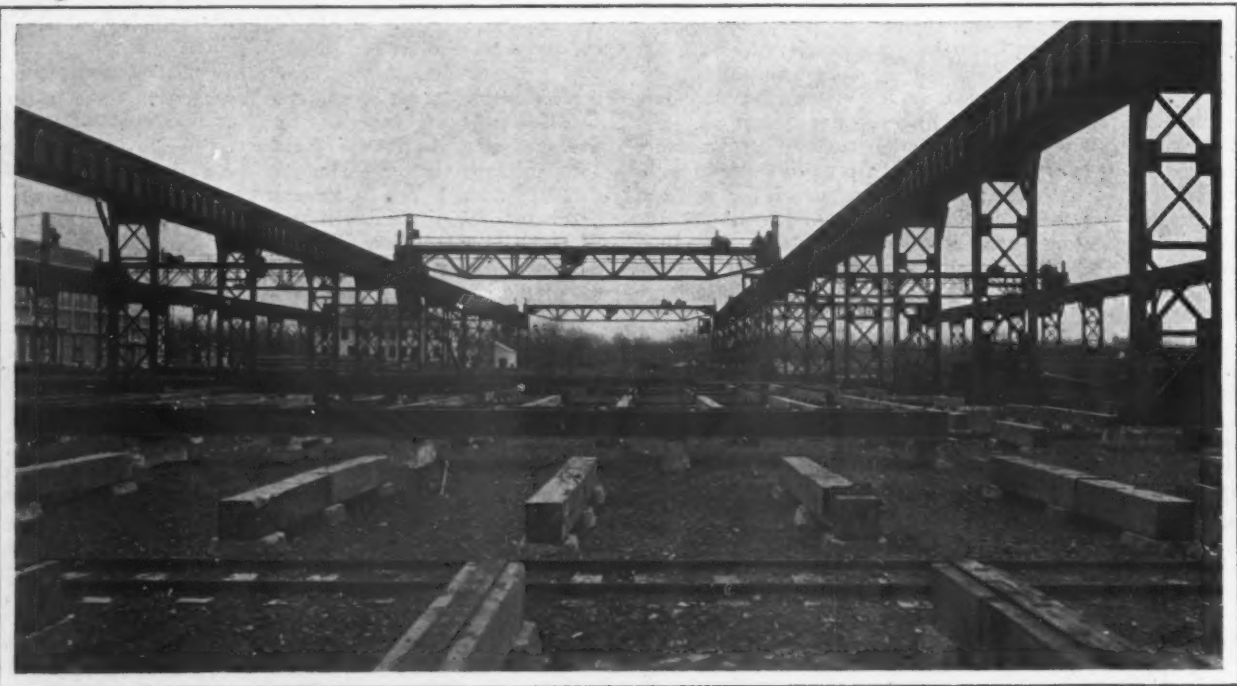
Emphasis has already been placed upon that phase of the United States Steel Corporation's project at Gary which provides for concentrating at the steel mills as many finishing processes as are conducted by its subsidiary organizations. The new plant of the American Bridge Company at Gary, completed about a year ago, was the first unit in this scheme and is especially interesting as an example of an arrangement intended to provide the best possible handling facilities for structural material. The plant is located on a tract of 160 acres of which 50 have been cleared for building and operating purposes. This site is connected with the steel mills by the Elgin, Joliet & Eastern Railroad belt line which connection also makes available to the plant the facilities of the several trunk lines passing through Gary.

Present Capacity 10,000 Tons per Month

The general scheme of the plant is here illustrated. It provides for a series of parallel shop buildings each 700

ft. long and accordingly offers a more limited length of travel. The central transept which serves as a temporary storage area of about 60,000 sq. ft. is a special provision for taking up the slack between the punching, shearing or forming operations and the assembly departments of the fabricating shops. It too is spanned by 10-ton Cleveland cranes which traverse its entire length on parallel runways, two cranes for each runway, available for transferring material between shops.

The standard gauge tracks traverse the plant in a north and south direction parallel to the axes of the shops through which they run. These standard gauge tracks are paralleled and supplemented by four industrial tracks of 3 ft. gauge, which are laid from the receiving yard through each shop to the shipping yard. These industrial tracks are laid with a slight grade from the receiving yard to the shipping yard so that a partial gravity movement of material is made possible. Extensions of the industrial track-age are laid throughout the plant so that in conjunction



The Three 90-Ft. Craneways in the Receiving Yard, Each with Two 10-Ton Cleveland Cranes

ft. long and approximately 285 ft. wide, with intervening areaways approximately 70 ft. wide. These parallel buildings are connected at the mid-section by a common transept 100 ft. wide. The present plant comprises two of these shop units with an aggregate capacity of 10,000 tons per month. The extension of the plant is provided for in a duplication of these fabricating units in the direction of the common transept axis. The fabricating shops front at the south end on a receiving yard which is also shown in one of the halftone engravings and at the north end they abut on a general shipping yard, both yards extending 750 ft. in a direction parallel to the central transept.

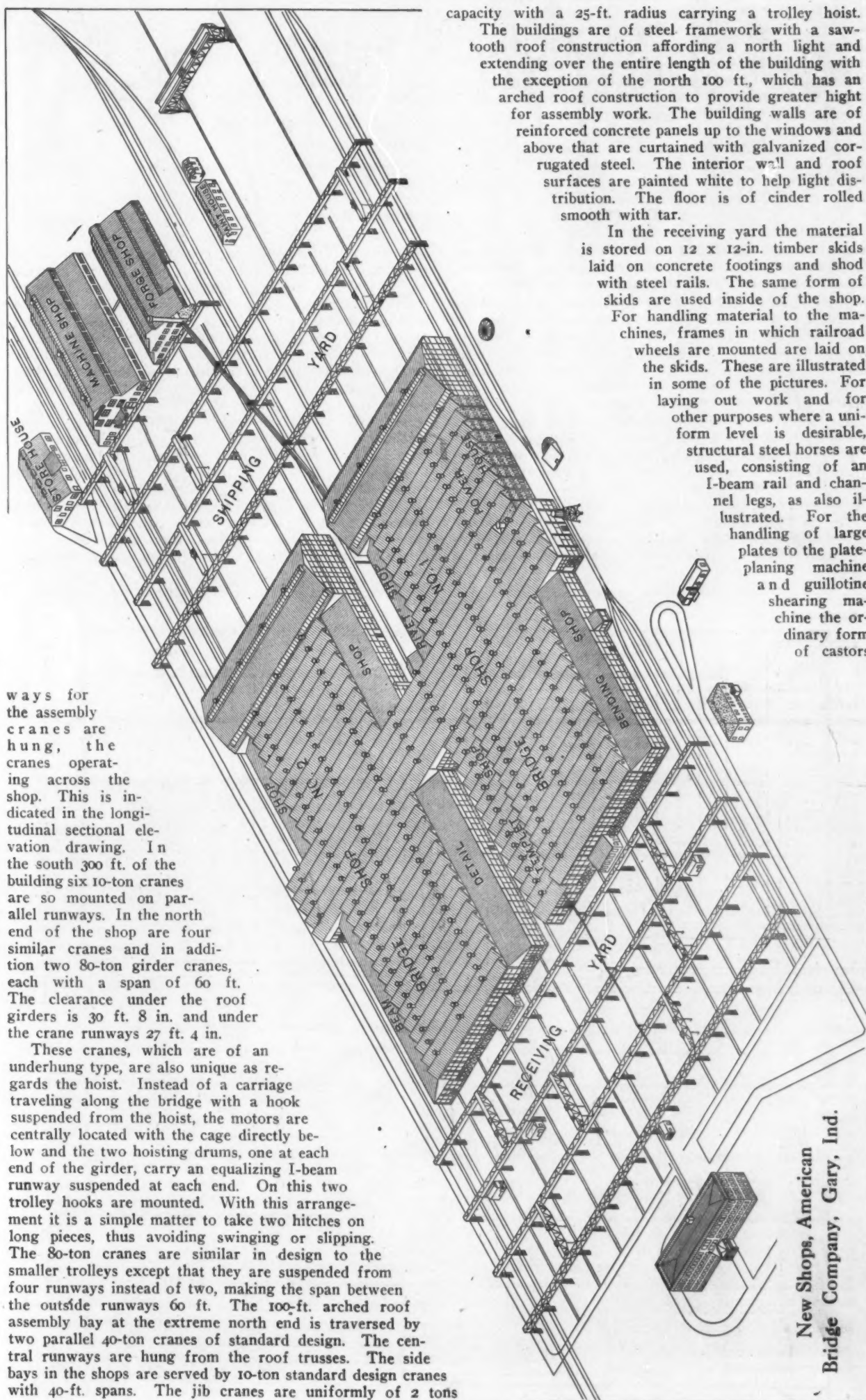
Traversing the length of the receiving yard are three parallel craneways each of 90 ft. span and each carrying two 10-ton Cleveland cranes. A similar arrangement provides handling facilities in the shipping yard except that here the craneways have a span of 80 ft. and the cranes are of 30 ton capacity. One of the shipping yard craneways is intended especially for serving the auxiliary machine and forge shops which are grouped at that end of

with the overhead crane service, facilities are provided for a very flexible handling of material about the plant.

For the inter-plant handling of material a very complete auxiliary crane service has been installed. The arrangement and sizes of these cranes are shown in a plan of the present shop buildings. Although there is a general separation of the heavy work for fabrication in shop No. 1 and of the lighter work for shop No. 2, the crane equipment is identical. A distinctive type of crane similar to those installed at other plants of the American Bridge Company is used. A general idea of their design may be obtained from the view in shop No. 1, which also shows the numerous jib cranes mounted on or near the fabricating machinery for the handling of material in the machines.

Remarkable Example of Crane Service

The building columns are spaced at intervals of 100 ft. along the building and 66 ft. 8 in. across the shop. Each transverse sawtooth roof section has a width of 20 ft., and from the roof girders making these sections, the run-



capacity with a 25-ft. radius carrying a trolley hoist. The buildings are of steel framework with a saw-tooth roof construction affording a north light and extending over the entire length of the building with the exception of the north 100 ft., which has an arched roof construction to provide greater height for assembly work. The building walls are of reinforced concrete panels up to the windows and above that are curtained with galvanized corrugated steel. The interior wall and roof surfaces are painted white to help light distribution. The floor is of cinder rolled smooth with tar.

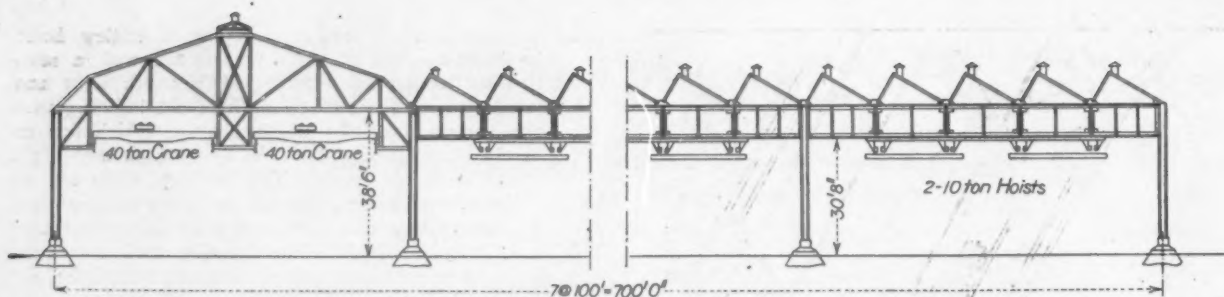
In the receiving yard the material is stored on 12 x 12-in. timber skids laid on concrete footings and shod with steel rails. The same form of skids are used inside of the shop.

For handling material to the machines, frames in which railroad wheels are mounted are laid on the skids. These are illustrated in some of the pictures. For laying out work and for other purposes where a uniform level is desirable, structural steel horses are used, consisting of an I-beam rail and channel legs, as also illustrated. For the handling of large plates to the plate-planing machine and guillotine shearing machine the ordinary form of castors

ways for the assembly cranes are hung, the cranes operating across the shop. This is indicated in the longitudinal sectional elevation drawing. In the south 300 ft. of the building six 10-ton cranes are so mounted on parallel runways. In the north end of the shop are four similar cranes and in addition two 80-ton girder cranes, each with a span of 60 ft. The clearance under the roof girders is 30 ft. 8 in. and under the crane runways 27 ft. 4 in.

These cranes, which are of an underhung type, are also unique as regards the hoist. Instead of a carriage traveling along the bridge with a hook suspended from the hoist, the motors are centrally located with the cage directly below and the two hoisting drums, one at each end of the girder, carry an equalizing I-beam runway suspended at each end. On this two trolley hooks are mounted. With this arrangement it is a simple matter to take two hitches on long pieces, thus avoiding swinging or slipping. The 80-ton cranes are similar in design to the smaller trolleys except that they are suspended from four runways instead of two, making the span between the outside runways 60 ft. The 100-ft. arched roof assembly bay at the extreme north end is traversed by two parallel 40-ton cranes of standard design. The central runways are hung from the roof trusses. The side bays in the shops are served by 10-ton standard design cranes with 40-ft. spans. The jib cranes are uniformly of 2 tons

New Shops, American
Bridge Company, Gary, Ind.



Cross-Section Showing the General Character of Steel Frame Work

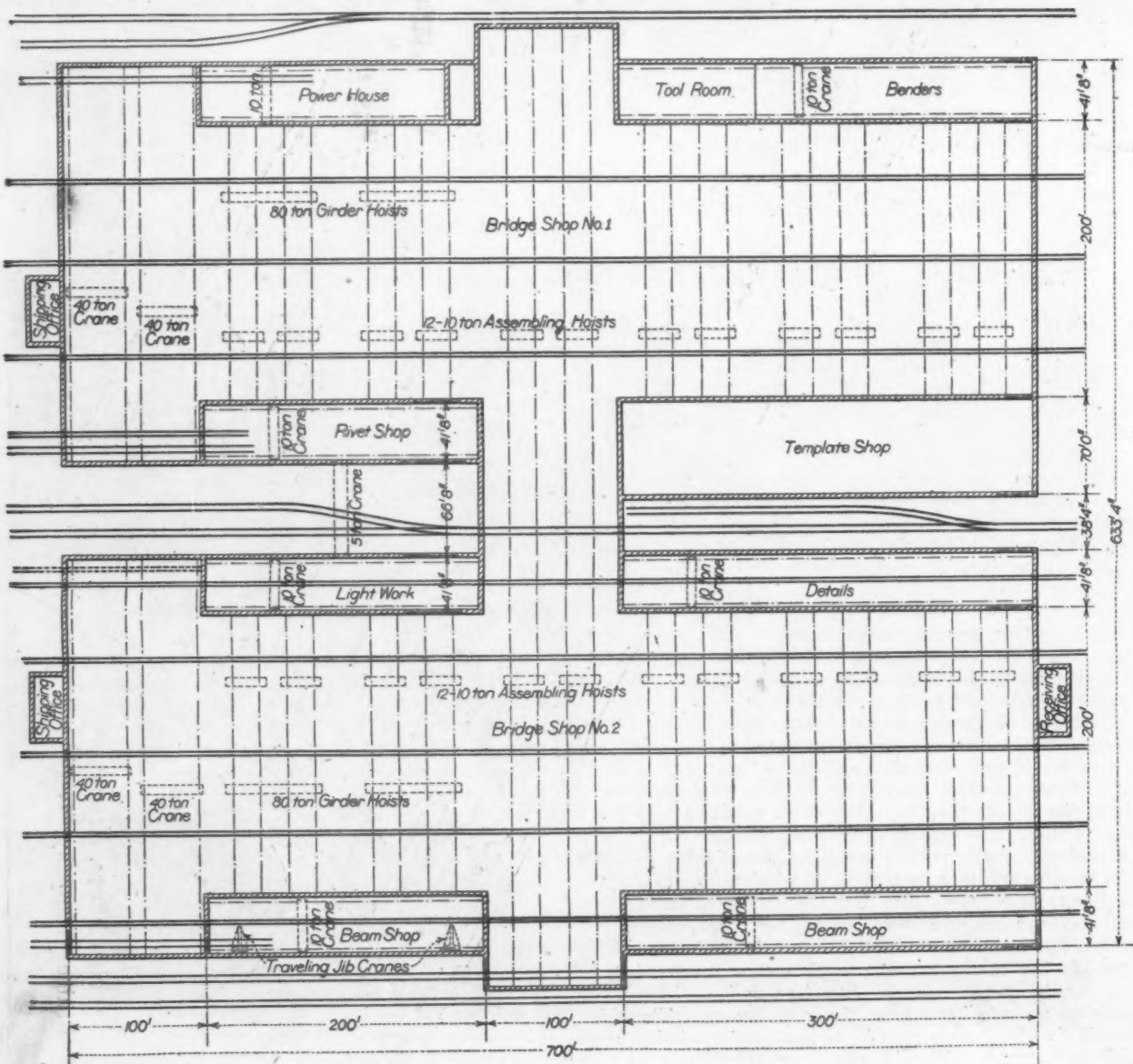
are employed. In the construction of the receiving and shipping yard, crane runways and the building framework, about 7,000 tons of structural shapes were required.

An interesting feature in the structural design of the shops has to do with the 100-ft. girders which extend north and south through the middle of each building. From the south end to the north end of the building the weight of these girders increases from 25 to 37 tons, which added strength is intended to provide for the increased weight of the material to be handled as it is gradually assembled toward the finishing end of the plant. The general layout of the plant and machinery provides for the heavier work being carried through the central portion of the floor area in each building, while the lighter or special operations are performed at the sides with an assembly movement toward the center.

In the south half of No. 1 shop the heavy beams and plates are punched and sheared, the equipment for which includes a Hilles & Jones 10-ft. guillotine plate shearing

machine, a 10-ft. guillotine type multiple punching machine, a 5-ft. similar punch, a 40-ft. plate planing machine and several open gap single punches and shears and I-beam coping machines, equipped with spacing tables. The multiple punches embrace some features of special design and are intended particularly for plate girder work. This portion of the shop is shown in one of the cuts. In another view is shown an additional portion of this floor space on which are located angle, rod and beam shearing machines.

As indicated in the background of the view of the assembling cranes already referred to (north portion of shop No. 1) provision is made for riveting and assembling. The heavy girders are assembled on skids laid in the central floor space. Another view of this riveting bay shows the riveting equipment, which includes two 100-ton hydraulic lifting riveting machines, two 60-ton hydraulic lifting riveting machines, and several gap riveting machines of smaller capacity. For handling material to these



General Plan of the Two Units Forming the New Plant of the American Bridge Company



View in Shop No. 1 Showing the Kind of Traveling Assembling Cranes and the Numerous Jib Cranes

machines and during the riveting operation, gantry cranes are installed, as indicated in the illustrations, operating on a track of 12-ft. gauge. The crane serving the 100-ton riveting machines is of 40 tons capacity and that for the

60-ton riveting machines is of 15 tons capacity. For reaming, in the finishing department, four gantry cranes, each equipped with six radial reaming arms are installed. Four rotary planing machines for facing the head and



Multiple Punching and Other Machines in South End of Shop No. 1



Special Design of Jib Cranes in the Side Bay of the Machine Shop

foot of columns and a three-head Newton Chord boring machine for boring the holes for bearing pins in bridge-work are a part of the equipment. In shop No. 2 the machinery installed is generally similar through of somewhat lighter capacity. All of the machines are driven by individual electric motors operating on 25-cycle 220-volt three-phase current.

As indicated, lean-to bays are arranged paralleling the

the Gary plant, but the templet requirements necessitate a large stock of white pine which is carried in the gallery of the templet shop for seasoning. The space devoted to the making of rivets is about the same as that for the templet shop and is spanned by a 10-ton 40-ft. crane. This crane is arranged with a hopper for loading the rivets into the top of steel vertical bins, as indicated in one of the illustrations. The bins have separate compartments for each size of rivet

central floor space of both shops on each side. At the south end of shop No. 1 are the heavy bending department and templet shop; at the opposite end on one side, the rivet shop; on the other side the power equipment. The east lean-to of shop No. 2 is fitted up for the detail work of the plant and the west lean-to is the beam shop.

The templet shop as noted is located at the southwest corner of bridge shop No. 1, from which it is separated by a 13-in. concrete fire wall. The shop is equipped with the usual planing machines, band saws, rip saws, boring machines and other woodworking tools, and is well arranged with reference to templet makers' benches. No foundry work is done at



Machine Shop of the American Bridge Company, Gary, Ind., from the

and bolt and are built with chutes through which the rivets may be discharged into truck cars operating on an industrial track. The equipment of this department includes four rivet machines and a bolt header. The bending department is equipped with two 300-ton hydraulic forming presses for bending the various shapes.

The proximity of this plant to the Gary mills makes the question of power exceedingly simple, and the plant at the bridge works is for the most part a converter station for stepping down the 22,000-volt current to 6200 volts for delivery to the rotary converters, and to 220 volts for use throughout the shop. The power plant lean-to is 200 ft. long and is spanned by a 10-ton 40-ft. crane. The equipment was furnished by the General Electric Company, including two converters, one of 440 hp. and one of 710 hp. Two Laidlaw-Dunn-Gordon compound compressors, direct motor driven, supply air for riveting at 100 lb. pressure. A low-pressure compressor of similar manufacture supplies air at 15 lb. pressure for the heating furnaces. Two Platt Iron Works high-service hydraulic pumps with 1500-

lb. accumulators supply the power for the hydraulic riveters. The advantages of independently driven machinery for the fabricating shop are emphasized in this plant where conditions make it economical to drive all tools with individual motors.

The machine shop is 100 ft. x 216 ft. and arranged with a central assembly bay spanned by a 25-ton 60-ft. Cleveland crane, and two side machine bays, each 20 ft.



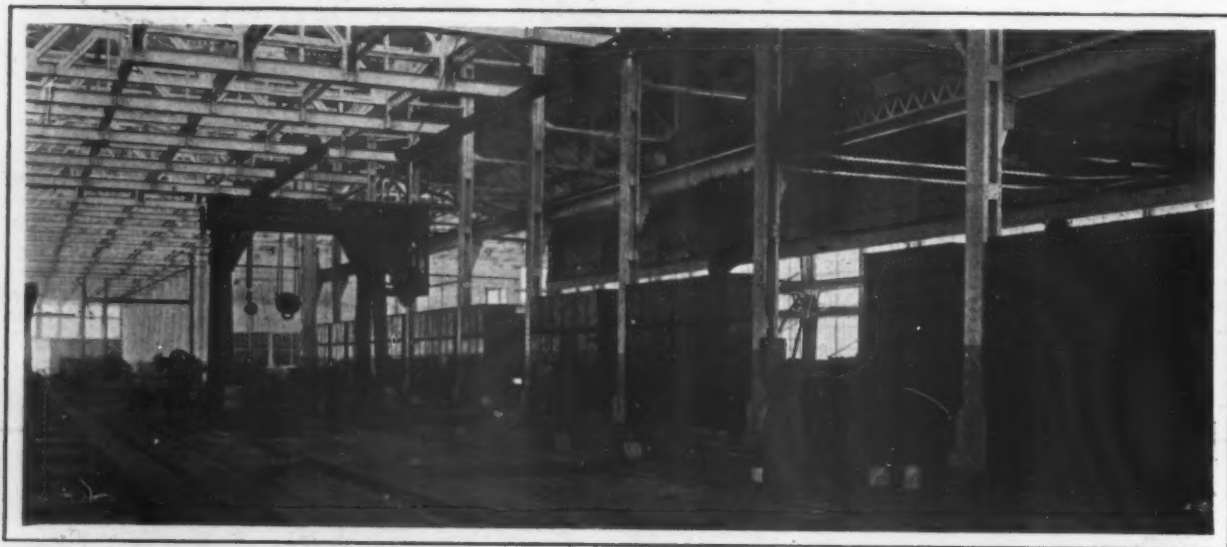
Compressors in the Power House



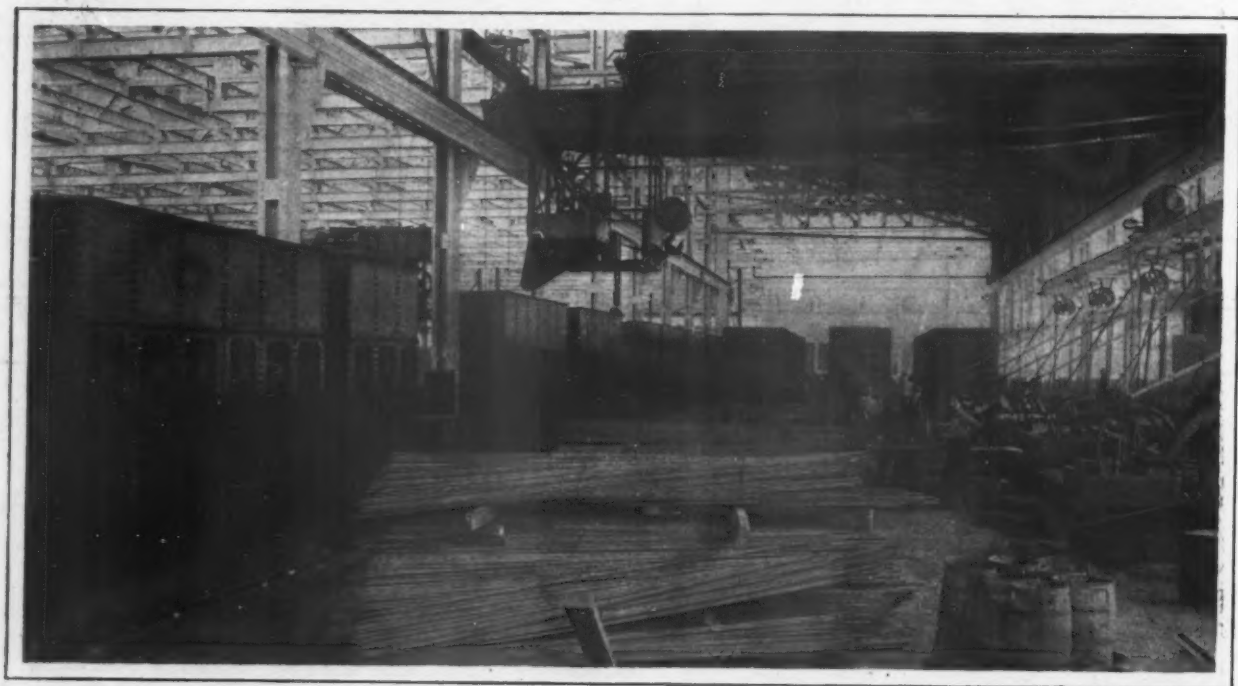
South End, Showing Concrete Floor for Assembling Drawbridge Turntables



Angle, Rod and Beam Shearing Machines in South End of Shop No. 1



Riveting Bay in North End of Shop No. 1, Showing the Gantry Crane



Rivet Making and Storing in the Rivet Shop

wide and also served by electric cranes. The machine equipment of the shop includes a 72-in. Niles-Bement-Pond planing machine, a 10-ft. Detrick & Harvey open-side planing machine, a 16-ft. Cincinnati boring machine, a 36 x 30-ft. lathe and a 60-in. gear cutting machine. Other smaller tools of a general character are installed. A feature of the shop is a concrete table 65 ft. in diameter placed in the main bay for the assembly of drawbridge turn tables and similar work. For bolting down the work, 12 x 12-in. timbers 30 ft. long radiating from the center are embedded in the concrete. A general view of the machine shop with this turn table center in the foreground is shown. The cranes in the side bays over the machine tools are especially designed jib cranes arranged both to revolve and travel along the 6-ft. I-beam runways from which they are suspended. One of the cuts illustrates the possibilities of these cranes.

The forge shop 100 x 100 ft. is located east of the machine shop. Its central feature is a 10,000-lb. steam hammer for heavy forging, but provision is also made for lighter forging operations for bridge pins and similar work. It also has a full equipment of bolt-cutting and threading machines. The storehouse for bolts and small materials is a building 60 x 100 ft. in plan located west of the machine shop. It is fitted with bins for carrying all commercial sizes of bolts and small materials, which are purchased in the market or obtained from other mills.

The Cement Industry in 1911

The statistics of cement production in 1911, prepared by Ernest F. Burchard, of the United States Geological Survey, show an increase over 1910 of only about a million and a half barrels. The increase in quantity is the smallest recorded within the last 13 years, and the fact that the total value showed an actual decrease indicates that trade conditions were not as satisfactory in 1911 as in 1910.

The total quantity of Portland, natural and puzzolan cements produced in the United States in 1911 was 79,547,958 barrels, valued at \$66,705,136. Compared with 1910, when the production was 77,785,141 barrels, valued at \$68,752,092, the year 1911 showed an increase of 1,762,817 barrels, or 2.27 per cent. in quantity, but a decrease of \$2,046,956, or 1.48 per cent. in value. The total production of Portland cement was 78,528,637 barrels, valued at \$66,248,817. This quantity reduced to tons is equivalent to 13,321,822 gross tons, valued at \$4.97 per ton. As compared with the production of Portland cement for 1910, which was 76,549,951 barrels, valued at \$68,205,800, the output for 1911 represents an increase in quantity of 1,978,686 barrels, or 2.58 per cent., and a decrease in value of \$1,956,983, or 2.87 per cent. The average price per barrel in 1911, according to the figures reported to the Survey, was a trifle less than 84.4 cents, as compared with 89.1 cents in 1910. In the average price for the country is included the value of 135,775 barrels of white Portland cement which sold at an average price of about \$2.50 per barrel.

Rather startling figures which have just been made public by the Pennsylvania Railroad show that it has in the past 25 years paid in wages more than two billions of dollars—to be exact, \$2,220,034,753.86. This is practically double the debt of the United States. The company has more than 73,500 stockholders. Its system has 11,503 miles of line and 25,236 miles of track, and about 185,000 employees. It hauls the largest tonnage of any railroad system in the world. It operates in 13 States, in which are located fully 75 per cent. of the industries of the United States, where 90 per cent. of the coal, iron and steel is produced, and where approximately 50 per cent. of the total population of the country lives.

The Standard Automatic Machine Screw Company, Cleveland, Ohio, recently incorporated with a capital stock of \$25,000, has established a plant at 437 Prospect avenue, Southwest, for the manufacture of a complete line of machine screw products. It has installed about a dozen automatic screw machines and expects to increase the number to 30. Edward Burke is president and general manager and M. J. Gleason is secretary and treasurer.

Door Veneering Machine

A new and interesting application of electrically-operated machines in wood-working plants is an automatic hydraulic veneering machine to be installed in the plant of the Commercial Sash, Door & Blind Company, Beaver Falls, Pa. The veneer is placed on the door frames and when a sufficient number are ready they are placed in the compress illustrated in the accompanying engraving which shows 110 1 3/4-in. frames piled in five rows. Two sets of I-beams are put in place one above and one below the frames and turnbuckle clamps attached to both sets are tightened so as to hold the frame intact. When this has been done the motor which is mounted on the ceiling, just above the compress, though not shown, is started and the operator opens the valve which controls the hydraulic pressure. The carriage rises gradually, compressing the frames until the pressure as indicated by the gauge at the side of the machine has reached the desired amount, 1300 to 1600 lb. per square inch, depending upon the nature of the wood. A pneumatic safety valve automatically opens at any predetermined pressure.

It will be noticed by referring to the engraving that the



An Automatic Hydraulic Door Veneering Machine Equipped with a Westinghouse Electric Motor Drive.

bottom portion of the compress is in the form of a truck and in this way the material may be loaded directly on the truck which is then rolled to the compress on car tracks. When the desired amount of pressure has been applied for the required length of time, generally about 2 min., the valve is opened, the pressure is gradually relieved and the truck returns to its normal position and is then rolled away. The time required for compressing is about 2 min.

Car Surplus Still Shrinking.—The American Railway Association's statistics show that on June 20 the net surplus of idle cars on the lines in the United States and Canada was 67,718, compared with 86,386 on June 6, with 116,201 on May 23, with 130,098 on May 9 and with 138,881 on April 25. One year previous to June 20 the net surplus was 65,934. It is stated that the reduction in coal car surpluses which have been a feature of the reports for some weeks will not continue much longer, but box cars will be coming into greater demand as the crop movement begins.

A forged steel valve, particularly suitable, owing to its strength, for use in connection with superheated steam and high pressure installations, has been produced by the Patterson-Allen Engineering Company, 2 Rector street, New York City. By the process of manufacture, which involves forging in steel dies, uniform thickness is obtained and the valves are tested to a hydraulic pressure of 1500 lb. to the square inch. A test of a 6-in. valve at 2000 lb. pressure, it is mentioned, showed no deflection.

Varied Uses for the Drilling Machine

Suggestions on Adapting the So-Called Drill Press of the Machine Shop to the Specialized Intensive Production of the Manufacturer

An unusually good example of what special study of the possibilities of a given metal working machine may accomplish is shown in the variety of work which may be done with the drilling machine. To this subject the Rockford Drilling Machine Company, Rockford, Ill., has given considerable attention, and its achievements must be reckoned as valuable contributions to the general scientific management movement in the light that the one type of machine is made to produce a maximum output of wide variation with minimum effort on the part of the operative as well as minimum waste time and therefore minimum cost. To use the company's own words, the so-called drill press may be called a vertical lathe, converting the machine from a "mere driller and borer of holes to the dignity of a machine of versatility, elasticity and practical economy." What the Rockford company offers to the maker of metal products is the idea of supplying to a given operator the proper number of spindles for his work, depending on the time of the longest operation and that involved in the loading and unloading of the pieces to be worked, and also the use of jigs and a careful provision of tools for the spindles.

To illustrate the idea, two different applications of a four-spindle Rockford gang drilling machine are shown. Fig. 1 indicates the methods followed in boring, facing one end and reaming bushings. In the particular case bushings with $15/16$ to $2\ 7/16$ in. cored holes were machined, requiring $1/8$ to $3/16$ in. stock to remove. On the table are mounted four universal chucks. The keys operating the three jaws of each chuck are controlled by steel levers bent at right angles for the convenient and rapid chucking and changing of pieces, as shown in the illustration. Above each chuck is a rigid arm clamped to the face of the column and to the table as well. Each arm is equipped with two bushings, one fastened to the arm, the second turning inside. The boring bar is keyed to this inside bushing and two slots are cut in the bushings to permit the boring and facing tools to pass through with the bar. By this means the cutters do not need to be removed except for sharpening. The reamers are made to fit the lower end of the boring bar with a taper fit and suitable locks for driving and they are constructed so that they may be slipped on to the bar without stopping the spindle and knocked off the bar as the spindle is withdrawn by the back of the reamer striking the bushing.

The operations consist of chucking the bushing, starting the feed, which trips automatically when the cutter is through boring. The operator then repeats the chucking operation on the three other spindles and returns to the first spindle where he finds the facing cutter directly over the work, ready for the facing. As soon as the facing is done spindle is withdrawn, the reamer is slipped into position and the hole is reamed.

After this a new piece is chucked and operator passes on to face and ream on the other spindles.

The spindles are kept running, as the boring and facing cutters are not taken from the bar and the reamer is changed while the spindle is running. With the $15/16$ -in. bore and a 3-in. depth of hole, production is said to be 650 per day. With the $2\ 7/16$ -in. bore and $4\ 1/2$ -in. depth of hole production is given as 400 per day. Parts other than bushings may be handled in the manner described, such as collars, brackets, etc.—pieces which would ordinarily be handled on chucking lathes. The advantage gained consists, as stated, in the operator's handling a number of spindles and having his time fully occupied.

Fig. 2 shows the use of the gang drilling machine for boring, facing and tapping the frame castings of a cylinder pump. The work requires two men, one setting up the castings in jigs and the other handling the castings under the four different spindles, and there are 32 operations in all. Where the holes have to be faced after being bored the spindle is equipped with the combined boring and facing tool of high speed steel. This is illustrated on the third spindle counting from the left. The power feed is set to trip automatically to leave the facing cutter immediately above the work. A few sweeps of the facing tool complete the facing operation.

In some cases where the holes to be tapped are of too small a diameter to use a collapsing tap successfully a solid tap is used as on the fourth spindle, which spindle is equipped with geared tapping attachment for reversing. In other cases where the holes are above 1 in. in diameter and a collapsing tap can be successfully used the tapping is done by this method illustrated on the second spindle. Each piece requires three settings and is mounted on an interchangeable jig plate so that the piece can be quickly slipped from the boring to the tapping spindle. In the

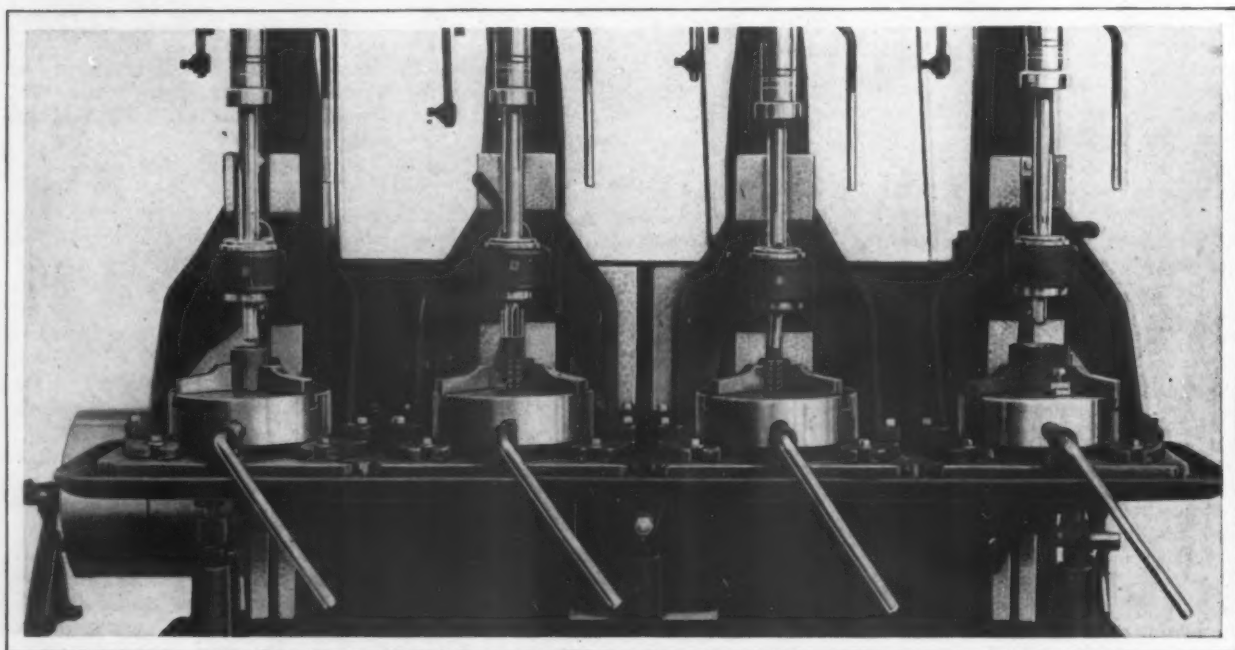


Fig. 1—Gang Drilling Machine Equipped for Boring, Facing and Reaming Bushings

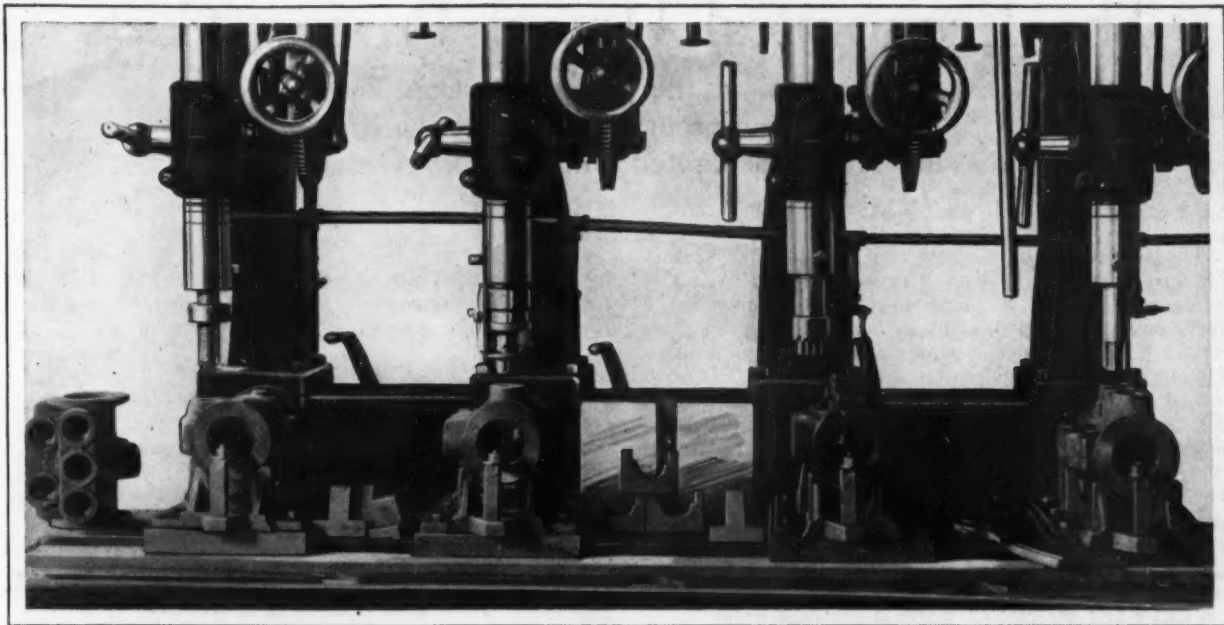


Fig. 2—Gang Drilling Machine for Boring, Facing and Tapping Pump Castings

different resettings in the jig different supporting blocks are required.

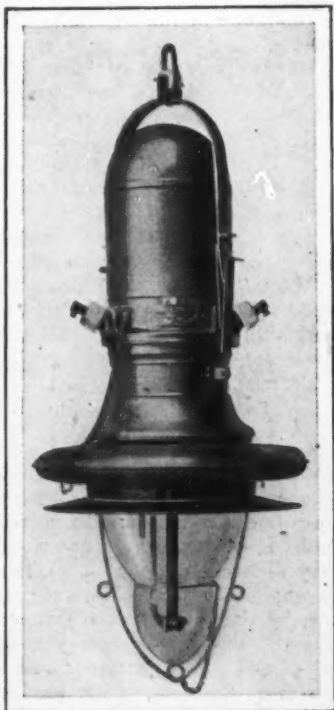
One operator with a helper can, it is stated, complete 70 of these pieces in a day of 10 hr., a total of 2240 operations, or 224 operations per hour. It is emphasized that if this work were done in a lathe it would be extremely difficult to re-chuck so as to get the proper relation of the different holes to one another, and the production by this method would necessarily be smaller than under the gang drill method.

New Alternating-Current Flame Arc Lamp

For use in foundries, yards, streets and other locations where a large quantity of light is necessary, the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has brought out a long burning alternating-current flame arc lamp. One of the special features is the use of impregnated carbons to give a yellow light and thus enable the lamp to give satisfactory service in smoky or dusty interiors of foundries, train sheds, steel mills and similar places. The arrangement of the vertical carbons and a reflector to slightly modify the distribution curve results, it is found, in a remarkably uniform distribution of light without shadows under the lamp. The magnetic fields are compensated so that the arc is steady and the flickering noticed in earlier types of lamps of this character has been eliminated.

Only one globe is used for inclosing the arc and this is designed to serve as a condensing chamber for the heavier fumes from the arc.

Each lamp undergoes a 2000-volt test for 1 min. before shipment. Two types of lamps are made, the series and the multiple. The former is adjusted for 10 amp with 60



A New Type of Alternating-Current Flaming Arc Lamp for Use in Mills and Foundries Made by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

volts at the terminals, but can be operated on a series circuit having a lower current value by using a separate auto-transformer with each lamp, arranged for mounting directly above the lamp. The power consumption is given as 425 watts and the electrical efficiency is 94 per cent. The multiple is adjusted for 10 amp at the arc and $6\frac{1}{2}$ amp at the terminals on a 100-volt circuit. The consumption of this lamp is the same as the other but the efficiency is slightly lower, being 83 per cent.

The Columbus Machine & Tool Company

The Columbus Machine & Tool Company, Columbus, Ohio, has been incorporated under Ohio laws, with an authorized and subscribed stock of \$500,000, half preferred and half common. It has purchased the manufacturing facilities, stock, patent rights and good will of the Vulcan Furnace Company, Warren, Ohio, and the Columbus Machine Company, Columbus. Plans are completed and contracts will be placed at once for a new modern manufacturing plant to be built in Columbus. The products will be Columbus gas and oil engines of four-cycle type, up to 600 hp., Vulcan mechanical fuel feeders, overfeed stokers, Columbus pipe machines, bolt machines, piston machines, rocking and dumping grates and hardened iron castings. D. H. Palmer is president and general manager; F. L. Griffith, treasurer; C. H. Wing, secretary and assistant treasurer; G. H. Mong, manufacturing superintendent. The sales manager has not yet been appointed. Until the new factory is ready for occupancy, business will be carried on in that of the Columbus Machine Company.

The Warner & Swasey Company, Cleveland, Ohio, has filed application with the Secretary of State of Ohio for an increase in its capital stock from \$500,000 to \$1,000,000. The increase is to provide for an extension of the company's business. During the past three years a large addition has been built to its plant and its capacity has been doubled. Another addition is now planned which will be used largely for shipping and storage purposes. The company recently built a warehouse and salesroom on Washington boulevard, Chicago, to provide for its trade in the West and Northwest. The principal business of the company is the manufacture of turret lathes, but outside of the machinery trade it is perhaps better known as the manufacturer of some of the largest telescopes in the world.

The Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., manufacturer of high grade open-hearth steel castings, has recently let contracts covering the erection of its No. 3 chipping shop and building, 100 ft. wide by 600 ft. long. The three 10-ton cranes for this addition were contracted for some weeks ago by the Alliance Machine Company, Alliance, Ohio.

The Economical Use of Process Costs

Applications of the System to Continuous Manufacturing Operations Where the Product Is Not Separated into Factory Orders

BY STERLING H. BUNNELL

The foundation of all cost-keeping is the elementary charge for the item of labor or material. Each worker in the factory devotes his time to jobs continuing for a longer or shorter period, and together making up his day's work. In performing his work, he takes and uses items of material, each of which has a definite value. If each item of work as well as each item of material is entered on a separate ticket, and the price of each item entered on the ticket, it is only necessary to collect the tickets representing the day's work and to sort them to bring each man's time tickets together, and the tickets for each kind of material together, to make up the payroll for the day and the cost of material used. After this is done, the tickets can be re-sorted with respect to the order numbers and again totaled to give the direct cost of labor for each order and the cost of material for each order.

In this way the total expenditure for productive labor and for material used on the factory work may be obtained with respect to each order in the factory, and in exact agreement with the accountant's books. The remaining portion of the cost of factory work, namely, the overhead expense, may be added by any suitable method, and the total of the additions for expense form the accountant's total for distributed expense. The equality of the total as shown by the cost accounts and the total as shown by the general accounts is thus insured, since each total is made up of identical charges.

Where the Product Is Not Separated Into Orders

This convenient and successful method of cost-keeping fails, however, in its application to lines of factory work in which the product cannot be conveniently separated into successive and differing factory orders. In the manufacture of paint, or pulverized material, or shoes, the work goes through in a continuing stream, not readily separated into items to be identified by order numbers. In the manufacture of shoes, for instance, the various pieces are cut out in quantities and put in stock in convenient lots. Later, convenient numbers are taken from these stock lots, assembled, and worked into completed shoes by a continuing process. Ten men may work on one operation in making a particular kind of shoe, while twenty men may be required to carry the same number of shoes per day through another operation, and thirteen men may handle the shoes through a third. At no time can a cut-off be made for the cost-keeper's convenience, and the shoes going through be divided as between successive thousands; for no single thousand is ever completed before the next thousand is well under way, and there is no visible difference between the successive lots of similar shoes.

In order to cope with such situations as exist in lines where goods are manufactured continuously over periods of days or weeks, it is necessary to resort to what may be called the process cost system. This method is, in brief, to keep the cost of the work done in a single department, or in connection with a single operation in a department, in units of days or weeks, treating all the work done in the interval as a separate job. Thus it may be found that the cost of bronzing hardware during a week is \$85. If during this time the output of the operation is weighed or measured, so that for instance it is found that 10,000 lb. of material have been passed through the operation, and if this material is all of similar size and shape, requiring about the same amount of work for one piece as for another, it is fair to conclude that the cost of bronzing this class of hardware is 0.85 cent per lb. It is only necessary to arrange processes so that the material going through may be considered to require the same amount of work per piece or per pound; then by simply dividing the total cost by the total output a process cost is arrived at, which if applied to the unit of product will give a correct cost value to the work done in this process or unit.

Since the total number of pounds or units multiplied by the total cost per unit gives a quantity equal to the total cost of the process, the equality between the cost records and the general accounts is assured.

How to Arrive at Process Cost

In establishing a process cost, it is necessary to proceed by considering the process as if it were a factory order of the usual kind. The cost keeper must study the situation, the equipment, the wages of the workers, and the expense of material and factory operation devoted to the process. In the operation of bronzing, for instance, the investigator may find that two men operate six tumbling barrels, each requiring 1 hp. for turning it when full of material, and occupying a certain definite floor space. The value of the floor space is to be analyzed as in other parts of the factory, and a charge computed which will cover a fair rental value of the space occupied by the entire process with its workers and stock of material and supplies. The total number of hp. hours used in operating the machines during the process for a month is then determined approximately, and the cost of a hp. hour determined and multiplied by the total number to give the monthly average cost of power. The quantity of supplies, such as acid, bronzing liquid, and the like, is next determined, and arrangements are made to keep a record of the quantities used during each interval of the process. These intervals should not be too short, owing to the inevitable variations, which will average out during reasonably long runs. The accountant's period of one month, or of the even four-week month, is most suitable for keeping process cost records. The wages of the workers employed on the process are kept by the usual method, so that the exact cost of labor during the process period may be known.

Provision is thus made to obtain the total cost of the process, consisting of space rental and power charge, cost of supplies and cost of labor. A further addition should be made for interest and depreciation on the machinery and equipment used and for the factory overhead expense. Without going into details of these items, it need only be repeated here that the whole process is to be considered as if it were a single machine under the usual factory order system of cost keeping.

The debit side of the process account is thus provided for. It remains only to arrange for weighing or measuring the quantity of work done day by day throughout the period. The total quantity of material turned out in the process, divided into the total cost of the process for the interval of time considered, gives the process cost per unit of material.

Wide Application of the System

The applicability of the process cost system is wide; and the system will be found of very great value in many cases where accurate cost-keeping seems impossible by more familiar means. In a nickel-plating shop, where hundreds of pounds of goods may be handled, covering many different designs, and often under conditions where the quantity of each design cannot be measured at the time, by the process cost system the method is to determine the total number of pounds or pieces put through, and to add to the previous cost of each piece or lot the process cost, to obtain the total cost. It is often easy to obtain the total quantity put through any operation, because the order book may show that a certain number of pounds of goods have been turned out during the month under consideration; or the goods sent to the process may have been weighed or counted just previously in order to determine wages for piece work done on the articles. It is generally possible to find some convenient way of determining the total quantity of articles passed through a process, even though it would be practically impossible to determine the separate cost of each lot.

Even where pieces of different character are handled in a process, as is often done in nickel-plating work where some parts may be roughly finished, others highly polished, or many pieces extremely small while others are large, there are expedients which can be applied to cope with a situation where reasonably accurate cost-keeping may at first seem impossible. Sometimes the work may be divided into two general sizes, one including all pieces larger than a certain size and the other all those smaller than the next size. An experimental process cost may then be run for a few days on each of the two sizes, running average lots as far as possible, and the difference in the cost of each size may thus be determined. In a bronzing operation, for instance, it may be found that pieces larger than 1 in. cost 12 cents per 100 lb., while pieces smaller than $\frac{3}{8}$ in. cost on the average 18 cents per 100 lb. This gives an approximation closer than would be obtained by averaging both sizes. Again, some articles, as in a polishing operation, may require longer treatment than others; but an experimental study of the time required to run through lots of each of the two sizes and the cost of each lot will give a basis by which the total cost of the operation may be fairly apportioned between the two sizes.

In many cases where the process cost system is properly applied, the pieces manufactured are very small, and the individual cost of the process work done on each piece is insignificant except when considered in connection with thousands of pieces turned out. In fact, the whole process may cost the factory but \$100 or \$200 a month, and yet it may involve small portions of many of the factory products. Under such conditions the cost of the process cannot be properly turned into the overhead expense and apportioned over the cost of the whole. It may be the case that a tin or silver finish on a certain class of hardware is unwarrantably expensive; yet this fact would never be disclosed by a cost system which apportions the entire cost of all finishes over all the articles. If, however, by a short study of conditions, a process cost can be derived which shows that the tinning operation costs the factory 90 cents per 100 lb., while the goods tinned are sold for an advance of only 40 cents per 100 lb., the unprofitable character of the process is readily observed.

Problems Solved by Process Cost Rather than by Factory Order System

The process cost system should never be used where the factory order system can be applied without unreasonable expense. But, in many lines of manufacture, where large quantities of different products are turned out day by day, many being run continuously throughout the year, and a portion of the whole involving work indiscriminately by a few men or departments, a well planned process cost developed by careful study by an accountant experienced in cost-keeping methods, will often prove a solution of the cost-keeping problem which would by any other method be impossibly expensive. Where continuing operations are carried on, the division of the product into separate lots is often annoying or impossible. Eyelets, for instance, may be made by successive operations on four or five machines, and ten of the machines used in the first operation may keep up with fifteen machines used in the following operation. Under such conditions it is often inadmissible to clean up all the machines, allowing the first series to run empty and stand idle until the last series have finished the work on the lot. But by applying the process-cost method, the expense involved in operating the entire bank of machines may be apportioned over the quantity of product turned out, so as to give the true cost of manufacture of each kind, without in any way interfering with the continuance of the operation or disturbing the routine of the workmen by the interference of cost-keeping employees.

The general accounts and the cost accounts of a factory employing the process cost system flow on like a stream of water through a pond. The total amount of money poured into the factory through the general accounts must equal the total value of the product run out by the factory process. The process cost enables the management to determine separately the cost of the total quantity of each kind of work which is put through, with due respect to the employment of one, two, three, or more processes which may be applied to certain portions of the output and not to the rest.

Solving the Smoke Problem*

BY BIRGER F. BURMAN.

The simplest device which absolutely and most clearly tells the real truth on the smoke abatement problem is our old kerosene lamp. There the fuel is fed through the wick and regulated by the screw; there is the chimney—the glass—and finally the holes for air supply regulated by valves. We all remember that when lighting the lamp we at first "screwed it low." Why? Not only to prevent the glass from breaking, but also to gradually heat it to prevent soot depositing on it. After the glass was hot we "screwed up the wick," but only to a certain point, because there was only one such point that gave us the best light. If higher, the lamp smoked; if lower, the light was poor; in both cases incomplete or poor combustion took place.

That point is the balance point representing complete and economical combustion for the lamp. It is governed by the screw, controlling the fuel supply and the size of chimney and the air valves. In other words there is a perfect balance between fuel and air supply. Can we find any better illustration?

The Possible Losses with Absence of Smoke

In industrial furnaces, as a rule, the conditions are not so favorable, and ordinarily it is impossible to regulate the conditions without special continued precautions to keep up the balance point. Some stoker man perhaps will tell you that his device will do it, but be cautious; sometimes he is fairly successful, but often his machine is very troublesome.

We are all the time talking about smoke and how to prevent it. If that is the only object of our fight, let us do like those who lead the exhaust steam through the chimney or like those who pull an enormous amount of air through the furnace. In both cases there is no smoke or at least it is only light in color, to the entire satisfaction of all concerned.

Let us make an analysis of the gases that are so satisfactory and perhaps the owner at least will not feel so easy. For years his engineer has not been able to come up to more than approximately 6 per cent. carbon dioxide at a flue gas temperature of about 600 deg. F. Thus he has been running his boiler furnaces with about 200 per cent. excess air and lost about 18 per cent. of his coal that could and should have been saved. But his poor stokers too have been carrying ashes with 30 per cent. carbon, which add another 6 to 8 per cent. to the loss, making total preventable loss approximately 25 per cent.

The Automatic Flue Gas Analyses

We are now stepping in on the field of automatic flue gas analyses as the only absolutely sure and reliable way of dealing with the smoke problem. With a CO₂ recorder as a guide we are able to come as close as possible to the ideal conditions of the kerosene lamp whether the furnace is equipped with a stoker or not. Like a pilot with his hands on the wheel and his eyes on the compass, so the man in charge of the furnace will hold his hands, figuratively speaking, on the damper and fuel feed and his eyes on the CO₂ recorder.

To obtain smokeless furnaces the first and most important point is to convince the manager of the furnaces. As long as he does not see the money value of it, it will be a more or less unpleasant fight. Every thoughtful engineer knows the value of a good CO₂ recorder and realizes its necessity, but he cannot get the manager to see it. This man will rather go on allowing combustion that robs his company of tens of thousands a year than to make any changes whatever. Again there are efficiency engineers who seldom go beyond actual time studies, etc. They take contracts to overhaul whole plants, but never touch such an important point as economical combustion.

The value of a CO₂ recorder in any plant does not consist merely in showing the kind of combustion there may be. It acts also as the visible representative of the manager himself. After its installation give an employee exclusive charge of it and inaugurate a bonus system for paying firemen. Then that disagreeable smoke problem will be solved.

*Based on a discussion of smoke abatement before the Engineers Society of Western Pennsylvania.

Plant at Oakley, Ohio, for Making Conveyors

Construction of Buildings of the Alvey-Ferguson Company, Accommodating Blacksmith, Metal Machining, Structural Steel and Wood Working Operations

The character of the modern industrial establishment as regards the structure of the buildings, the composition of the floors, the wide expanses of window glass area and roof lighting and the arrangement and provision of equipment for securing economy of production and hygienic conditions for employees, is well typified in the new plant of the Alvey-Ferguson Company, Inc., in the Oakley district of Cincinnati. On October 1, last year, the company, which makes conveying apparatus for handling all classes of materials indoors and outdoors, occupied the main building of its new plant, having completed the removal of part of the equipment from its Louisville plant on that date. Considerable new machinery was also in-

façades of the two flanking buildings are designed in harmony with it. Within the spacious rectangle is located the carpenter shop, while outside one of the rear corners of the rectangle adjacent to the main building is the power house. The plant was designed and constructed under the direction of the Cincinnati office of the Allyn Engineering Company.

The buildings are of reinforced concrete and steel throughout and are thus fireproof. The stock is protected by a sprinkler system with an emergency fire alarm as an added protection. This with the heating systems were installed by Evans, Almirall & Co. Individual lockers, wash-basins, etc., as well as bubbling drinking fountains



South End of Structural Shop Indicating the Volume of Sawtooth Roof Lighting—Superintendent's Office in Center Background

stalled and the new works have shown three times the capacity of the former plant. Some idea of the new establishment may be gained from the accompanying illustrations.

The general scheme of plant arrangement comprehends a large hollow rectangle. Along one side extends a single lofty story building 100 ft. wide and 365 ft. long. This has an unusually interesting roof structure and at present accommodates the blacksmith, machine and structural shops. From its rear end extends a long building enclosing the back side of the rectangle. Along the side opposite the 100 x 365-ft. building is a building with three tiers of windows giving a height of building over twice that of the blacksmith, machine and structural shops, while the center of the front is occupied by the office building separated from the side buildings by driveways. The office building is a structure which architecturally presents an unusually pleasing appearance and the front

are provided, and special attention is clearly paid to the health and welfare of the employees.

In the blacksmith, machine and structural shops it was desired to obtain perfect light in all portions of the building which is 100 ft. wide, and to this end a sawtooth construction was used for the center 60 ft, with a flat roof for 20 ft. at each side. Large sash areas in the side walls were provided to give full light at these points, while the light in the center portion is shown in the photograph of the machine shop. The columns are 20 ft. apart longitudinally, and there are only two rows of interior columns forming a 20 ft. aisleway down the center of the building with a 40 ft. machinery area at each side.

The saw-tooth trusses are placed on 20 ft. centers and the end trusses are carried on 26-in. I beams. The roof and walls are of Hy-Rib with 2 in. of cement plaster water proofed and the material was furnished by the Trussed Concrete Steel Company, Detroit. The entire

roof is covered with composition roofing. The windows in the side walls are United Steel sash with one ventilator in each sash. The windows in the saw-teeth are also United Steel sash, the lower half being stationary, and the upper half swinging outward, using a Drouve operating device. Cooper Hewitt mercury vapor arcs provide the artificial light when necessary.

In the southeast corner of the main building surrounded by a low wire partition, or fence, is the machine shop. The equipment includes one Bradford lathe, five screw machines made by the National Acme Company, one Cincinnati-Bickford radial drilling machine, one Williamis-White bulldozer and one Steptoe shaping machine. On the west side of the building there are installed various



Drafting Room in Second Floor of Office Building



Wood Shop Where A-F Conveyor Hardwood Rollers Are Turned Out

frame. The exterior of the building is of stucco to match factory buildings. The large general office with private offices on the first floor have red tile floor and base with antique finishings. Weathered oak office furniture harmonizes with the finish. The second floor is given up to the engineering department and the drafting rooms which have windows on all sides affording 'perfect' light. High power tungsten lamps are provided for use when necessary. The floor has a concrete finish.

The tearing down of the Northern Iron Company's blast furnace at Port Henry, N. Y., which was blown out June 8, has been completed and work on the new stack, which will be built on the same foundations, was begun this week. It is planned to blow in again about September 15.

punching and shearing machines, for both light and heavy work.

The interior of the wood-working shop is shown in one of the engravings. Light steel trusses extend from wall to wall, thus doing away with the necessity of interior columns. The roof, walls and steel sash are similar to those of the main building. The shavings exhaust system was installed by Kirk & Blum, Cincinnati, and as shown in the picture has floor sweeping openings calculated to make it easy always to keep the room away from the machines free from accumulations.

The two-story building is of reinforced concrete throughout, of hollow tile and concrete joist floors. The roof has tile apron walls carried on the concrete



Blacksmith Shop, Showing Case Hardening Furnaces for Bearings, Gas Furnace and Bulldozer for Forming Supports

Cylinder Boring and Milling Machine

Simultaneous Operation on Two Twin-Cylinder Castings a Special Feature

For boring two twin-cylinder automobile engine castings and simultaneously milling the flanges on two more, the Beaman & Smith Company, Providence, R. I., has brought out a machine which it designates as its No. 2 universal cylinder boring and milling machine. This ability to bore and mill two different sets of castings simultaneously is made possible by the use of a revolving

power movement of from 6 to $11\frac{3}{4}$ ft. per minute in either direction. The spindles in this saddle are two in number and are made of crucible steel. They run in hard bronze boxes and have tapered ends 3 in. in diameter for face milling cutters. The front bearings are 4 in. in diameter and 6 in. long while the rear ones are 1 in. less in both directions. Three speeds of $7\frac{1}{2}$, 10 and 14 r.p.m., are provided by gearing having a ratio of $21\frac{1}{2}$ to 1 and means are provided to compensate for wear. The four crucible steel boring spindles run in hard bronze boxes, the dimensions of the front bearings being 4 in. in diameter and 6 in. long, while the rear ones are $2\frac{3}{4}$ in. in diameter and 5 in. long.

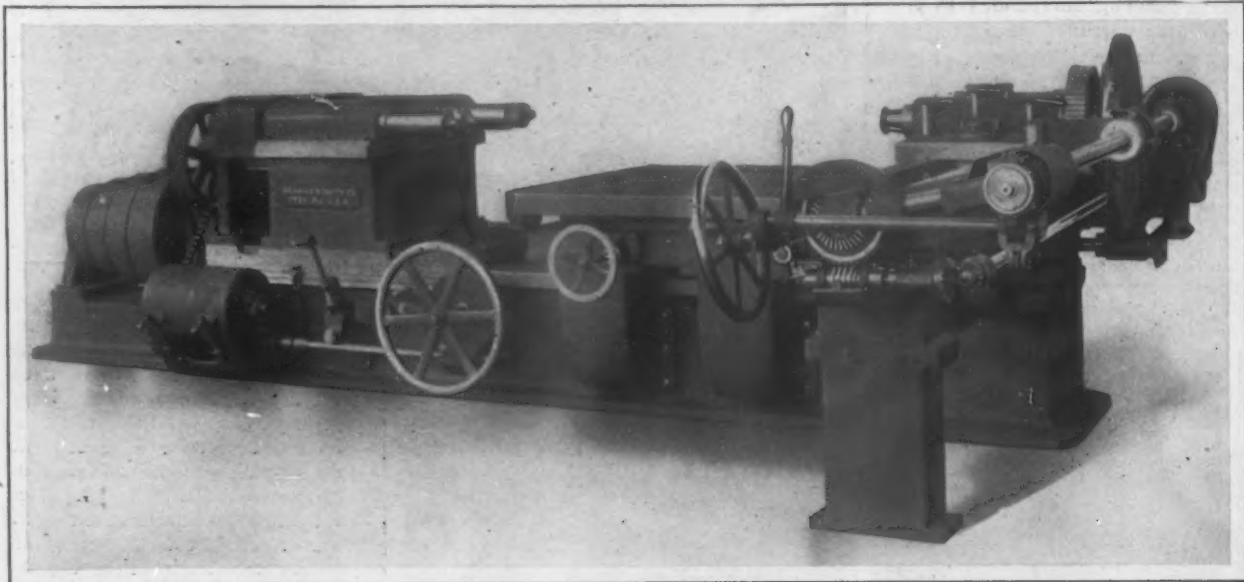


Fig. 1—The No. 2 Universal Cylinder Boring and Milling Machine Built by the Beaman & Smith Company, Providence, R. I.

table. After the milling operation has been performed on the flanges of two of the castings, the table is revolved and they are brought into position to be bored. Fig. 1 is a view of the machine, showing the operating side, while Fig. 2 is a view taken from the opposite or driving end and gives more details of it.

As will be noticed from the engravings the machine consists of a substantial bed supporting at one end a carriage with two boring heads, each of which carries two spindles and at the other end the cross-head carrying the saddle with two milling spindles. The revolving table which is 54 in. square is located near the middle of the bed. It has a ball bearing which can be raised into position by a handwheel to take the weight of the table and permit it to be revolved easily. When the machine is in operation, however, the table does not rest upon this bearing, but on a large diameter scraped surface. There are four stop pin holes and the table can be securely fastened with a locking pin after it has been located.

The milling saddle is 20 in. wide, 41 in. long and has a movement of $52\frac{1}{2}$ in. on the cross-head and also a quick

The spindles are fitted in twin heads at center distances to suit the requirements of each particular case and the ends are made to fit cutters as may be specified. Four speeds of $22\frac{1}{2}$, 28, 35 and 44 r.p.m. are available and the ratio of gearing is 8.4 to 1.

The carriage is 34 in. wide and 54 in. long and has a movement of 30 in. on the bed by a large diameter screw working in a bronze nut and also a quick power movement of 6 ft. in either direction independent of the spindle drive. The thrust is taken by ball bearings. The head base is so located on the carriage that the front end of the carriage beyond the end of the spindles and passes under the table so as to distribute the wear as equally as possible. Positive geared feeds are provided for the carriage at the rate of 4, 8, 16 and 32 revolutions of the spindle for 1 in. of carriage travel. The feeds for the milling heads are from 1 to $4\frac{1}{4}$ in. per minute at any spindle speed.

Two countershafts are provided for transmitting power, that for the boring spindles having a tight and loose pulley 16 in. in diameter for an 8-in. belt and running at a speed of 265 r.p.m. The boring spindles are driven from this

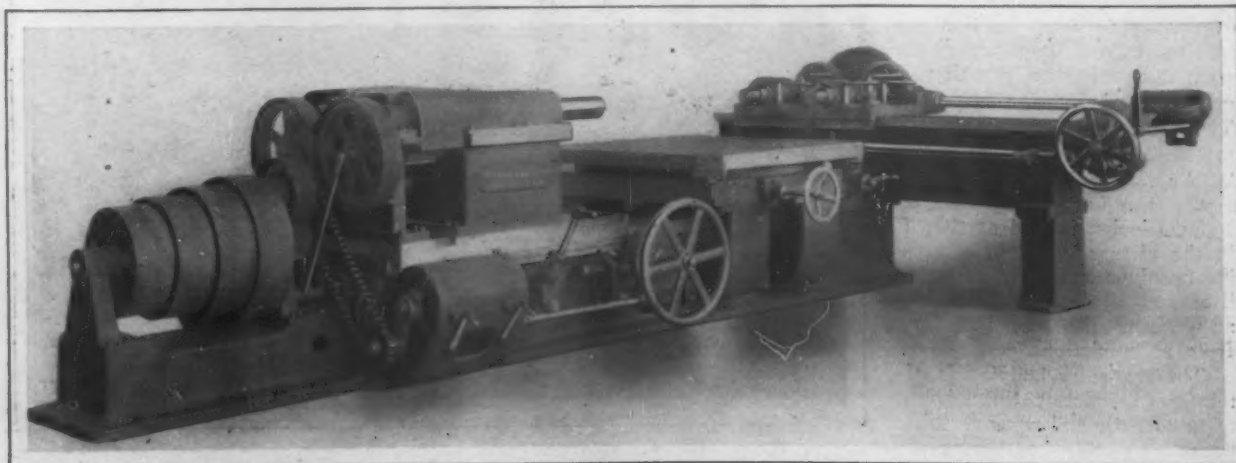


Fig. 2—View from the Driving End

shaft by a 6-in. belt on a four-step cone pulley, the diameters of the various steps ranging from $17\frac{1}{4}$ to 24 in. The milling spindle countershaft has a 14-in. tight and loose pulley with a 4-in. belt and runs at a speed of 215 r.p.m. It also has two loose pulleys of the same dimensions to drive the quick power movement. The milling spindles are driven by a 5-in. belt on a three-step cone pulley, the diameter of the smallest step being $11\frac{1}{2}$ in. and that of the largest 16 in. The quick power movement for the milling carriage is driven by a 4-in. belt running over a 10-in. pulley.

The maximum and minimum distances from the center of the table to the face of the boring head are 57 and 27 in. respectively. From the center of the spindle to the top of the table the distance is $9\frac{5}{8}$ in. and from the center of the table to the end of the milling spindles the distance varies from $28\frac{3}{4}$ to $31\frac{3}{4}$ in. The distance from the center of these spindles to the top of the table is $9\frac{3}{4}$ in. The weight of the machine is approximately 28,000 lb.

A Mammoth Ratchet Wrench

The Lowell Wrench Company, Worcester, Mass., is manufacturing a line of reversible ratchet wrenches designed especially for heavy steel construction work. The first of the type seen at the left in the illustration was built especially for tightening the main spanner bolts of an extension bridge. It takes a nut $5\frac{1}{2}$ in. in diameter, the hole through the head permitting the passage of a $3\frac{1}{2}$ -in. bolt. The lever is 5 ft. 6 in. in length. The wrench at the right is designed for similar work of smaller size. Both are of the standard type manufactured by the Lowell Wrench Company. They are arranged so they can be changed to a right or left motion at pleasure.



Two Recent Lowell Wrenches

A Universal Coil Making Machine

The universal coiler shown in the half-tones, built by F. H. Sleeper, 12 Shafner street, Worcester, Mass., will coil and cut open, flat-end springs, straight, tapered and barrel shaped, right or left hand, $\frac{1}{4}$ -in. to 2-in. diameter, of No. 20 to No. 10 wire, using from 3 in. to 6 ft. of wire. The output is from 35 to 100 springs per minute. In other sizes of machines wire from No. 25 to $\frac{1}{2}$ in. is handled.

The machine presents a radical departure from accepted practice, which consists of coiling a long length of spring, cutting it up, and flattening the ends after heating. The wire enters the machine through the rolls seen at the right in Fig. 1, and is pushed through guides to the coiling and cutting-off mechanism, shown in detail in Fig. 2. The

rolls have two grooves, the one to take the larger sizes of material, the other the smaller sizes, thus covering the full capacity of the machine without the necessity of changes. The same scope exists in the guides. Passing to the arbor, which is half a cylinder, it is formed. If a right-hand spring, the lower cutter is employed in cutting off; if a left-hand, the upper cutter is used.

The diameter is regulated by the position of the coiling point. On the main shaft of the machine are three cams, one acting in varying the diameter of the coil, another to give the pitch or opening between the coils, and the third for cutting off. Each is quickly adjustable. Taper and barrel shapes are accomplished by a combination cam and lever motion, one cam furnishing the extremes of these forms.

The 300,000-hp. Keokuk Power Development.—In connection with the 300,000-hp. development of the power of the Mississippi River at Keokuk, Iowa, there will be a main power house 1750 ft. long, 123 ft. wide and 133 ft. high above the foundations. The dam extends from Keokuk to Hamilton on the Illinois bank of the river, a distance of 4568 ft. It is surmounted by a viaduct carrying a 29-ft. roadway, rises 50 ft. above the average river bed, and contains 119 spillways controlled by steel flood-gates, each 30 ft. wide by 11 ft. high and operated by an electric hoist. The dam, it is stated, will be the longest monolithic structure in the world, having a total overall length of 9096 ft. The initial installation of electric generating units will include 15 alternators direct connected to vertical hydraulic reaction turbines of the single runner type. Each wheel, mounted on a vertical shaft 25 in. in diameter, in a spiral chamber 21 ft. 3 in. in diameter and molded in the concrete substructure, will operate at a constant speed of 57.7 r.p.m. and will have a normal capacity of 10,000 hp. The electrical apparatus is being furnished by the General Electric Company and alternating three-phase current will be generated at 11,000 volts. The generators measure 32 ft. in diameter by 12 ft. high, and the total weight of each machine is over 600,000 lb. The initial equipment, it is thought, will probably be in operation by the middle of 1913.

The Lehigh Navigation Electric Company of Philadelphia, a subsidiary of the Lehigh Coal & Navigation Company, has recently contracted with the General Electric Company for three 10,000-kva., 11,000-volt horizontal turbo-generating units for its new power producing plant at Hauto, Carbon County, Pa. This is the initial apparatus for the great steam generating plant that is to be operated from the culm banks in the anthracite region. Eventually this plant will produce more than 100,000 hp., which will be sent to Philadelphia and New Jersey cities and may eventually reach New York. When completed the power houses at Niagara will be the only ones exceeding it in size. The immediate outlay in the plant is to be \$3,000,000, and when it is finished it will represent an investment of \$10,000,000.

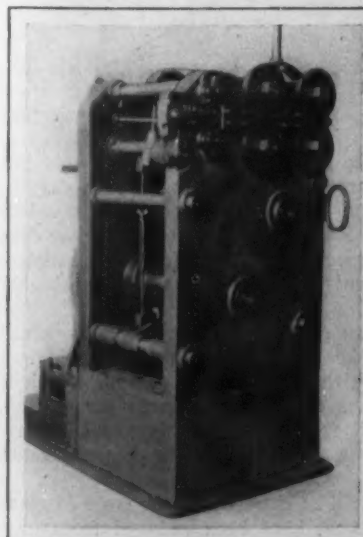


Fig. 1—Front View

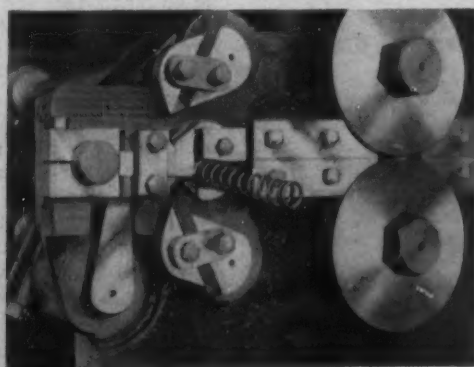


Fig. 2—Details of Coiling and Cutting Off Mechanism

A UNIVERSAL WIRE COIL MAKING MACHINE

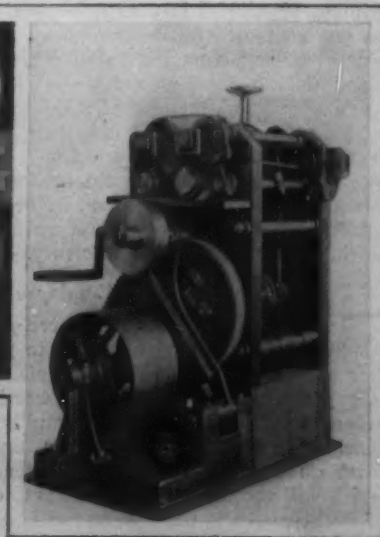


Fig. 3—Rear View

Examples of Reduced Manufacturing Costs with Higher Wages to Employees and Substantial Gains in Efficiency

BY W. L. MYLES

Employing cheap, unskilled labor to replace the higher priced skilled mechanic has proved a failure, as the overhead charge on unskilled labor and the cost of spoiled work overbalance the difference paid in wage. Some manufacturers have tried straight piece work, but this does not produce the desired incentive or satisfactory results in all cases, for the mechanic is constantly in fear of being cut in his rate, and therefore one cannot expect to get the mechanics' full efficiency. We realize that well paid, skilled and efficient labor is more desired than unskilled, inefficient labor, but the question is, how to obtain and maintain this high class labor.

in due time receives the reward of high wage and the higher the wage earned by the mechanic the lower the cost of production to the manufacturer.

After spending considerable time operating the bonus system of pay, the writer can say without fear of contradiction that this system produces most satisfactorily the desired results, namely: low costs, higher wage, greater efficiency and maintains in addition that spirit of co-operation between employer and employee which is so essential to a successful business. To prove that this system of pay actually produces low costs, higher wages and greater efficiency a few concrete examples may be given.

In a machine shop where this system of pay is well developed, the cost department was asked for a comparison cost of machining an engine cylinder of a certain type. The cost department's record is shown in the accompanying table:

	Work Done on Day Work Plan			Work Done on Bonus Plan		
Operation	Time taken, hr.	Rate per hour	Total cost	Time taken, hr.	Rate per hour	Total cost
Bore and face.....	30	\$0.328	\$9.84	16½	\$0.407	\$6.71
Plane top.....	8½	.34	2.89	5	.408	2.44
Mill sides.....	45	.35	15.75	15½	.43	6.67
Drill.....	20	.23	4.60	14½	.28	4.07
Totals.....	103½		\$33.08	52½		\$19.89

Part No. EE 6	Bonus Card		Order No. 18228
Draw No. EE 5			
Mechanic No. 214		Name A. Johnson	
Operation To turn face cut ring grooves file and finish Pistons		Job Started 7 A.M. Feb. 10/11	Job Finished 10 40 A.M. Feb. 15/11
		No. of Pcs. Finished 80	
Time Made per Piece		Guaranteed Wage Rate per Hour regular	
100 Min.	33 Per Hrs.	Work Delivered to Stock Room	
90 " "	35 " "	Allowance none	
80 " "	37 " "	Inspected by J.W. White	
70 " "	39 " "		
60 " "	41 " "		
50 " "	44 " "		

Record		No. of Hours on Job	No. Part Finished
Credit for _____	Total Time _____	No. of Finish & Post _____	Total Prem. _____
			Time per Pos.
Labor Cost per Pos.			
Shop Cost " "			
Prem. " "			
Total Cost per Pos.			

○

are doing less than 60 per cent. of what they might do without physical injury or overexertion. This means that 40 per cent. of our mechanics' efficiency is wasted some way or other. Now, the question arises, how are we to reclaim this 40 per cent. wasted efficiency. Not by the old drive and thumb method of making a mechanical tool out of the men—this method is a dead issue and it should be. Every mechanic of intelligence and ability ought to resent this method, for it forces the mechanic to slight his work when the foreman is absent. Not by employing cheap, unskilled labor to do high class work, for this means cheap work, high costs and low efficiency.

Some incentive is needed whereby the mechanic will be compensated according to ability to produce his work in a fair amount of time. The only plausible and fair way is to pay the mechanic what he is worth under some system of pay whereby both employer and employee will be compensated in a satisfactory manner for the extra efforts put forth on their part. One of the very best systems which will accomplish these results to the entire satisfaction of both parties is the differential bonus plan of pay. Under this system the man who works and produces his work

day work plan—nearly half the time. It also shows that the mechanic received on an average of 68 cents per hour more, or 18 per cent, higher wage.

Another case where good results were obtained: The cost records showed the time to turn, face, cut ring grooves, file and finish pistons was 180 min. per casting. A time study was made of this job and the bonus card issued to the mechanic is here reproduced. The first time this was done it took the mechanic 100 min. to finish each casting, consequently he made no bonus, but the company saved 80 min. per casting over the former cost. The next time they were made it took the mechanic 50 min. for each casting—he therefore made 44 cents per hour, or 33 per cent. higher wage.

Cost to company (on day work plan) 180 min., which at 33 cents per hour makes the cost 99 cents per casting.

Cost to company (on the bonus plan) 50 min., which at 44 cents per hour makes the cost 36½ cents per casting. This shows a saving of 130 min. per casting, and by paying the mechanic 11 cents an hour more the company saves 62½ cents per casting.

Many more cases could be cited where the costs of manufacture under this system have been reduced from one-half to one-third of former costs and mechanics have re-

ceived in return increases in pay of 25 to 50 per cent. for the extra effort put forth, but these will be sufficient to convince the doubtful manufacturers who are timid about giving this system a trial that it actually produces the desired results in a satisfactory way to both parties.

What the Bonus System Accomplishes

The bonus system has been subject to some very hard criticism by both employer and employee, but nevertheless it produces the results and compensates the man as no other system of pay has. Some say it is not fair to the mechanic as it makes a mechanical tool out of him, rendering him in a short time an object for the scrap pile. This is entirely wrong, but on the other hand it awakens him out of that dreamy mechanical way of working and puts new life, interest and energy into him; for he realizes that in order to earn his bonuses he has to utilize his hands and brains at the same time, thereby avoiding many mistakes, and the compensation he receives is sufficient to repay him for his extra effort. In a good majority of cases, it is but a matter of giving a little more thought and attention to his work, reducing thereby a great part of the physical effort formerly exerted.

It is also a source of education to the employee. It teaches him to rely upon himself, for by following his instruction card he needs but little help from his foreman. This allows the foreman to give more of his time to his regular duties other than directing the work of each mechanic. Under this system helpers and laborers are given the opportunity to show their ability in the mechanical line, and in many cases helpers have become good mechanics and mechanics have become functional foremen, thereby increasing their earning power and adding materially to the efficiency of the plant. H. L. Gantt has very aptly put it: "The frictional lag due to the inertia of the workman is changed by the bonus into acceleration."

This system requires a close investigation of each and every operation of the work. By this close investigation the management is always in touch with the progress of the work throughout the plant and the men are every ready and willing to disclose and help remove obstacles that prevent their earning bonuses and the managing problem is greatly simplified.

Cramp Shipbuilding Company's Year

The annual report of the Wm. Cramp & Sons Ship & Engine Building Company for the fiscal year ended April 30, 1912, compares as follows:

	1912	1911
Net profits, insurance and taxes deducted	\$473,021	\$283,507
Fixed charges	264,913	277,339
Surplus for year	\$208,108	\$6,168

The general balance sheet as of April 30, 1912, compares as follows:

Assets		1912	1911
Real estate, machinery, etc.	\$13,216,189	\$13,185,564	
Bills and accounts received	792,570	1,168,306	
Materials and supplies	402,686	412,787	
Cash	755,019	422,311	
Accounts in process of adjustment	667,880	662,201	
Total assets	\$15,854,346	\$15,851,171	
Liabilities		1912	1911
Capital stock	\$6,098,000	\$6,098,000	
Notes, bonds and mortgages	5,184,912	5,429,912	
Wage accounts and accrued interest	604,988	489,405	
Profit and loss account	3,966,445	3,833,854	
Total liabilities	\$15,854,346	\$15,851,171	

The company made the following payments: In reduction of capital debt, \$220,000 serial notes redeemed and \$25,000 first mortgage bonds redeemed; for purchase of real estate, new tools, machinery and improvements, \$111,819.

President Henry S. Grove says: "There is every evidence of a largely increased volume in the shipbuilding business, while the activity in the direction of hydro-electric plants has increased the demand upon the facilities of the I. P. Morris Company to such an extent that your management has authorized the expenditure of half a million dollars for new shops and appliances."

The Rochester & Pittsburgh Coal & Iron Company, Punxsutawney, Pa., has increased its indebtedness from \$2,678,000 to \$4,678,000.

Brass Melting Furnaces

An Inquiry Into Current Practice to Determine What Types and What Methods Give Greatest Efficiency

The American Institute of Metals, formerly the American Brass Founders' Association, has a committee, with H. W. Gillett, 84 Euclid avenue E., Detroit, as chairman, which is co-operating with the Bureau of Mines at Washington in an inquiry into the efficiency of brass melting furnaces. The object is to improve, if possible, on present types and particularly to cut down the oxidation on volatilization losses of metal. Experimental work is planned, but meanwhile data will be gathered from brass foundries. Using as a basis of its figures a working day for one furnace, the committee of the institute asks its members, to send it answers to the following questions designed to bring out the features of current practice:

1. What is the type of furnace used (pit, tilting with crucible, tilting without crucible, or electric). Maker's name.
2. Shape and dimensions of furnace.
3. Lining—material and thickness.
4. Cover—shape, size, material.
5. Size of crucible used.
6. What fuel used.
7. (a) Details of fuel and air supply. For coal and coke furnaces give grade used—analyses and B. t. u., per lb., if possible. What vacuum, if natural draft; what pressure, if forced draft.
(b) For gas, give whether natural gas or artificial—B. t. u. per cu. ft., if possible; pressure of gas at burner; pressure of air at burner; type of burner.
(c) For oil, give specific gravity, or degrees Beaume, and temperature at which density was determined; B. t. u. per gallon, if possible; pressure of oil at burner; pressure of air at burner; type of burner.
(d) For electricity, give voltage and amperage taken by furnace, and details, as power factor of furnace, etc.
8. Number of furnaces one furnace tender can handle. (Answer 8-19 on basis of red brass.)
9. Amount of fuel used per furnace per day—lb. of coal or coke, gal. of oil, cu. ft. of gas, kw. hr. of electricity.
10. Number of heats per working day.
11. Hours per working day for furnace, from time cold furnace is started till day is over.
12. How often are furnaces relined or other repairs made?
13. How many heats in the life of a crucible?
14. Total lb. metal charged per day per furnace; total lb. composition ingot; total lb. new metal; total lb. gates and sprues; total lb. borings; total lb. other scrap.
15. Total lb. metal poured per day per furnace—deducting all losses by oxidation or volatilization, or in the slag or skimmings.
16. Total lb. metal recovered from slag, skimmings, etc., per furnace per day.
17. Gross percentage of loss during melting.
18. Net percentage of loss during melting, taking account of metal recovered from all metal-bearing refuse.
19. Average analysis of alloy produced.
20. Answer 8-19 for yellow brass, manganese bronze or any other brass or bronze you have figures on.
21. Are your figures based on a single day's run, or are they averages? If the latter, on how long a period is the average based?
22. Discuss the relative advantages and disadvantages of the various types of furnaces you have tried. Is there any difference in the quality of the metal melted in various furnaces either on physical tests, pressure tests, or as to its behavior in the foundry?
23. What precautions are taken to secure immunity of employees from accident, poisoning or occupational disease?
24. To what extent are employees subject to "brass shakes," lead poisoning, etc.?
25. What precautions are taken to lay or remove poisonous fumes or irritating dust, to which employees may be exposed?
26. Do you post notices and give instructions to employees in regard to hazards to which they may be subject? If so, please send copies of notices and of instructions.
27. Please give any information along these lines you can that has not already been brought out by the questions.

Replies, so far as they apply to individual plants, will be held confidential by the committee and by the Bureau of Mines.

The galvanizing department of the Deforest Sheet & Tin Plate Company at Niles, Ohio, maker of sheets, metal roofing and siding and black plate, is now in service, and the company claims that it is operating the largest galvanizing outfit in the country for the handling of sheet steel. It is equipped to galvanize sheets to the extreme width of 54 in. and in all gauges from No. 10 and lighter. The company further states that the method it uses in pre-treating and in coating its sheets enables it to obtain absolute uniformity in coating.

Wear of Conveyor Belts

An Analysis of the Causes and Means for Their Reduction

BY REGINALD TRAUTSCHOLD

One of the most efficient and economical methods employed for handling materials in bulk is by troughed belt conveyors, but certain disadvantages tend to prevent a more general use of this equipment. The most serious depreciation of a belt conveyor is that of its belt, which in many cases is as high as $33\frac{1}{3}$ per cent. At the same

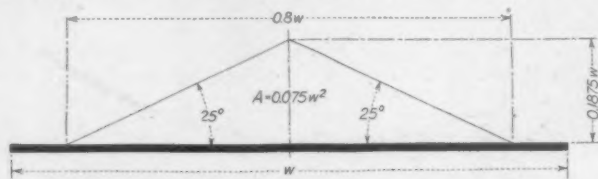


Fig. 1—Ideal Distribution of Load on a Flat Conveyor Belt

time the belt is the most expensive part of the equipment, costing about $37\frac{1}{2}$ per cent. of the entire cost of an equipment in which the width of the belt is 10 per cent. of the length of the conveyor, and increasing to as much as $57\frac{1}{2}$ per cent. for very long conveyors. A maintenance charge of $33\frac{1}{3}$ per cent. per annum on this one item is a serious consideration and any appreciable reduction in this percentage will add largely to the economic value of the belt conveyor and thus increase the demand for such apparatus. Abrasive wear due to slippage or sliding of the material on the belt, etc., is the chief cause of belt deterioration and if it could be reduced by 25 per cent. the life of the belt would be sufficiently increased to reduce the cost of maintenance of the entire equipment by enough to about cover the burden of interest, taxes and insurance.

The wear on the belt caused by the material carried may be charged to slippage of material on inclined stretches of the conveyor, due to excessive inclination; slippage occasioned in loading the conveyor and wear occasioned by the rearrangement of the load during transit other than that produced by longitudinal slippage from the inclination of the conveyor.

The wear occasioned by longitudinal slippage of material limits the practical inclination of a belt conveyor to a comparatively small angle, which if not arbitrarily adopted is the angle of repose of the material handled with respect to the belt. If the material should simply slide upon itself and the layer of material in contact with the belt remain stationary no destructive wear would occur. Naturally, the properties of the carrying surface of the belt is an important point in the question of the true angle of repose. A belt with a hard, highly vulcanized cover increases the tendency of the material to slide on its surface, and one with a comparatively soft and resilient cover is to be preferred. Such a cover will become harder after being exposed to the air for some time and there is always the liability of chemical action between the material con-

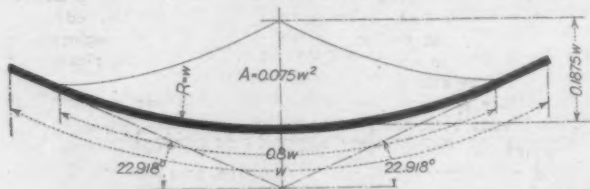


Fig. 2—Ideal Distribution of Load with a Troughed Belt

veyed and the belt, which would also ordinarily tend to harden the cover. This tendency of the cover to harden is somewhat compensated for by the fact that the surface of a belt upon which the slippage has been a minimum will become slightly rougher and a thin layer of protective material is apt to adhere thereto.

An ingenious method of further reducing the destructive abrasive wear and one for which important advantages have been claimed is a belt where a certain num-

ber of plies of duck have been omitted from the central portion of the carrying side and this depression filled with rubber. The claim for this belt is that it possesses increased resisting qualities at the point of greatest wear, but practice does not seem to endorse it. If slippage of material occurred only through excessive inclination of the conveyor, the maximum wear would be at the center of the belt. In the case of a properly installed inclined belt conveyor and the more common horizontal ones no longitudinal slippage should occur and the advantages of the belt construction just referred to would disappear. In fact, it will be shown that the most destructive wear on the belt does not come at the middle of the belt.

Preventing excessive wear on the belt of an inclined conveyor due to longitudinal sliding of the load can only be accomplished by limiting the inclination of such installations to less than the angle of repose of the material on the belt. This diminution is governed by the speed of the belt and the nature of the material handled, but should never be less than 10 per cent. of the angle of repose of the material on the belt.

The wear due to the loading of the conveyor is more difficult to prevent. Neither the wear nor its causes can be entirely overcome, but the destruction can be lessened by proper design of loading chutes and by increasing the area of belt over which the load is distributed. If it were possible to deliver the load in the same direction and at the same speed as the belt travels, no wear would occur at the loading points, but such conditions can be only

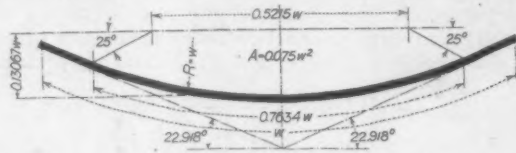


Fig. 3—Actual Distribution of Load in a Troughed Belt Between Pulleys

approximately approached and an oblique impact shock is unavoidable when the load strikes the belt. A resilient belt naturally reduces the destructive action of such impact, and to reduce the shock with which the material strikes the belt further an adjustable curved plate or lip is usually attached to the lower edge of the chute so that the material leaving the chute is deflected in the general direction in which the belt is moving. The fact that a cross-section of the belt of the ordinary conveyor approaches the arc of a circle would necessitate a very complicated shaped lip in order that the material would be discharged in exactly the same direction and at the same speed at all sections of the chute. The practical impossibility of devising such a lip limits this means of reducing wear to that gained by using a lip shaped and curved so that the clearance between it and the belt is as nearly uniform at all points as possible. Such a lip would tend to deflect the load in the center of the chute to a greater extent than that passing down toward its sides and to reduce correspondingly the speed of the material delivered at the center to a greater extent than that delivered at the sides. The friction of the material against the sides of the chute, its tendency to stick together and the greater curvature of the belt at the sides of the chute where it may be assumed that on the imaginary plane parallel to the belt the impact shock would be the greatest all tend toward a uniform delivery of load to the belt as far as destructive slippage is concerned, and in a properly proportioned installation this is practically the case. The correct proportioning of the slope of the chute, the curvature and form of its deflecting lip, etc., can be arrived at but approximately in planning the layout of an installation and should therefore be supplemented by experiments and tests at the time of erection of equipment.

The third cause of wear, the rearrangement of the

load on the belt during transit, is really the main one, and little effort seems to have been made to devise means for its reduction. It is impossible to place the load on the conveyor so that no rearrangement will occur, but it is possible to reduce the rearrangement that takes place on the average well proportioned troughed conveyor belt, and it is the main object of this discussion to present a method of arriving at such important economy.

To demonstrate most clearly the arguments that will be advanced, it is advisable to assume certain conditions. The angle of repose of the material on the belt will be taken as 25 deg., which is less than the average, but one that if generally adopted would be safe. The first consideration is that of the most economic load per unit length of conveyor, and as every troughed belt conveyor has a certain section of length where the carrying belt is flat, such as the straight pulley at the point where the inclination of the belt is reduced or at any discharging point, the most economic cross-section of load for a flat belt will meet all requirements. The shape of such a section is an isosceles triangle, and, as it is well to have 10 per cent. of the width of the belt free from load along each side, the most economic load in cubic feet of any belt conveyor per foot of conveyor is about three-fortieths of the square of the width of the belt in inches, represented by area A , Fig. 1. This area also represents the maximum economic load that any belt conveyor is capable of carrying, irrespective of the depth or the form of the trough. The practical curvature to the belt is limited, for the greater the depth of the trough the greater the sacrifice of tractive efficiency, and consequently the greater the power required to convey a given load. It is well to keep the trough of the belt shallow, and practice has shown that ordinarily a conveyor with the belt edges inclined about 23 deg. to the plane of the belt gives the best results and that such degree of trough is necessary to insure against the possibility of the vibratory motion of the belt disarranging the load. The most economic and natural curve to the belt is

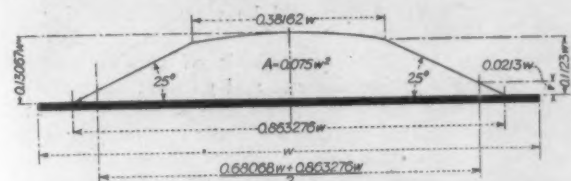


Fig. 4—Position of Load Carried on a Shallow Troughed Belt When Passing Over Pulley

that of the arc of a circle and a conveyor with the edges of the carrying belt inclined about 23 deg. and the center portion curved so that the plane of the edges is tangent to the curved section would give the ideal trough section. A belt having its radius of curvature equal to the width of the belt and the length of the curved section equal to four-fifths of the width of the belt would have its edges inclined at an angle of 22.918 deg. to the plane of the belt. Such proportioning would give an almost ideal trough section and will be adopted as a working base. A flat belt loaded as indicated in Fig. 1 could be curved to the ideal trough without any abrasive wear of the material sliding on the belt, for the material in contact with the belt would remain relatively the same and the rearrangement of the load would be limited to a certain sliding of the material upon itself. The load would take an arrangement as indicated in Fig. 2 and, theoretically at least, the belt could be troughed and flattened with no abrasive wear on the belt itself. The area A is then the ideal distribution of load for a belt conveyor, but it is impossible of actual attainment.

A belt conveyor is almost invariably loaded through chutes, and in order to arrange the load on the belt and to prevent spilling two comparatively long guides, or skirtboards, are necessary. These skirtboards, attached one to each side of the chute, govern the distribution of the load on the belt, and just before the load is carried beyond their confines it should be so distributed that its top is about level. To study the behavior of the load after delivery to the belt it will be assumed that the trough section is ideal, that the angle of repose is 25 deg., that the skirtboards of the loading chute are such as are used in good practice and that the conveyor is carrying its maximum economical load. Under such conditions the section

of belt carrying the load and to which the load is delivered would be 68.068 per cent., approximately. If the chute is properly proportioned the wear due to placing the load on the belt would be a minimum and comparatively little destruction would have taken place up to this point. Immediately upon leaving the confines of the skirtboards, however, destructive wear commences as the load tends to take a position as indicated in Fig. 3 and the section of belt in contact with the load increases to 76.34 per cent. This rearrangement of load would mean a sliding of the load on 8.272 per cent. of the belt surface. On the belt passing over any straight pulley the material would again slide and finally rearrange its position to that indicated in Fig. 4. This last position of load necessitates a contact surface, between the load and the belt, of 86.3276 per cent.; in other words, wear from abrasive action of the material

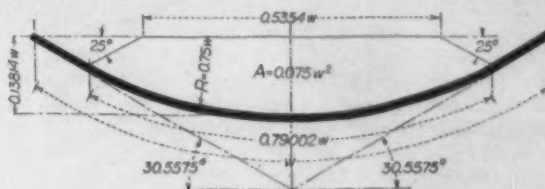


Fig. 5—A Deep Trough Conveyor Belt Between Pulleys

sliding on the belt, from the time the load was first delivered to the conveyor, would extend over 18.2596 per cent. of the surface of the belt. Such wear, none of it at the middle of the belt, must occur to any conveyor under the conditions assumed, and for future comparison will be designated as equal to 18.2596w. Should the belt be re-troughed after having been flattened with load, a further rearrangement of load would be necessary, but this would cause no additional destructive wear, for the material in contact with the belt would remain in relatively the same position, rearrangement of load being limited to a sliding of the material upon itself.

The conditions taken for the foregoing example are such as are accounted good practice at the present time, but it is of equal importance to consider other conditions that are frequently found and which may possess some good points. The one condition that is variable, from the standpoint of construction, is that of the trough of the carrying belt, and here practice has shown that the limiting practical inclination to the sides of a troughed belt is about 30 deg., any greater inclination sacrificing economy in power consumption. Increasing the inclination of the sides of the belt correspondingly reduces the radius of curvature. A troughed belt with a radius of curvature of three-quarters of its width would form a trough with sides inclined 30.5575 deg. to the plane of the belt, provided the length of the curved section is maintained as four-fifths of the belt width. A conveyor with such a belt, though requiring more power than one having a shallower trough, is a practical one, many installations of such character giving economical results, and the behavior of material having an angle of repose of 25 deg. will be considered on such a belt, the feeding chute being assumed to be as efficient in loading as that in the previous example. At the moment of leaving the confines of the skirt boards, the surface of contact in this case is 69.04 per cent., or about 1.5 per cent. more than that at the same moment in the first case, and with the same load,

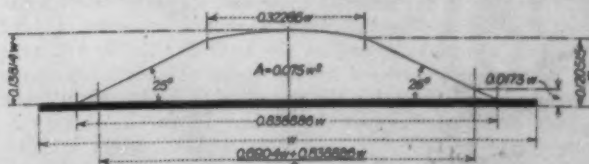


Fig. 6—The Same Load as Shown in Fig. 5 Passing Over a Flat Pulley

the destruction to the belt through loading is reduced by an equivalent amount, but this gain is too small for more than passing remark. The rearrangement of the load during subsequent transit on the troughed belt is shown in Fig. 5 and the final distribution of the load on flat sections of belt similar to that shown in Fig. 6. The increase in contact surface between the material and the belt, or the area over which destructive sliding would only occur, is the difference between the area covered at

time of loading, 69.04 per cent., and that over which the load is finally distributed, 83.8886 per cent., as shown in Fig. 6, or 14.8486 per cent. of the belt area. In the first case the destructive sliding took place over 18.2596 per cent. of the belt's surface, while in the second case such sliding occurred over only 14.8586 per cent. Furthermore, in the first case the amount of material sliding over the greater area was comparatively more than that which slid over the lesser surface in the second case, in a proportion of about 213 to 173. Expressing the value of the destructive wear from the rearrangement of the load in the same terms as in the first example, such wear would equal 12.06025w, a reduction of about 34 per cent. A conveyor with the ordinarily deepest practical trough where the sides of the belt are inclined about 30 deg. should show a considerable saving in belt depreciation, and if the loading chutes are so well proportioned that the depreciation due to the abrasive action of the material when delivered to the belt is kept below 10 per cent. of the probable total belt depreciation in a conveyor with shallow troughing idlers, a result that would not seem unattainable if proper care be taken in the design and installation of the loading chutes, the total maintenance cost would be reduced by an amount about sufficient to carry the entire burden of interest, taxes and insurance. This result could only be obtained by a sacrifice in the economic use of power on account of loss in tractive efficiency by a conveyor with a deep trough. The cost of power would then enter the question of economic construction of carrying or troughing idlers.

That the cost of power need have little effect upon the economy gained by using deep idlers is a fact that must not be overlooked, for the average belt conveyor is comparatively long and a corresponding large number of troughing idlers are necessary to support the carrying belt properly. Hence, the logical economical construction is to have the deep troughing idlers only at points where the conveyor is being loaded and the balance of the carrying idlers proportioned to form the ideal trough. Such practice necessitates only three of the deep idlers at any loading point, for the skirtboards of the feeding chute are usually about 10 ft. long, one deep idler a short distance behind the chute, one at about the middle and a third a short distance ahead of the extreme ends of the skirtboards. This arrangement would reduce the tractive efficiency of the belt but little, the loss in efficiency diminishing with the length of conveyor. Although it is probably difficult to realize the full reduction of maintenance costs by the adoption in all installations of varying troughing effect, nevertheless an important gain is invariably possible by increasing the depth of the carrying belt trough at loading points and reducing the trough on the carrying stretches, provided that the distance between loading points or loading and discharge points is sufficient for the trough of the belt to be increased and reduced.

New Publications

Export Trade Directory. Compiled under the supervision of, and with explanatory notes by B. Olney Hough, editor of the American Exporter. Cloth, 267 pages. Published by the Johnston Export Publishing Company, 135 William street, New York City. Price, \$3.

Of value to the manufacturer seeking to extend his export trade is the Export Trade Directory, now in its third edition. One who examines the book for the first time is at the outset impressed by the large number of agencies already in existence for the distribution of American made goods to all quarters of the globe. In particular may be mentioned a list of export commission houses in New York City which covers 77 pages, averaging eight firms to a page. Houses of this character, Mr. Hough points out in the preface, do from 50 to 75 per cent. of the country's foreign trade, a fact which may be considered to justify the implied defence of such houses which the directory contains. It is stated also that no effort has been made to indicate financial responsibility and it is suggested that it may sometimes be advantageous to get such data from the regular sources. The list of foreign buyers with branch offices in New York City, whose purchases are mainly restricted to their own requirements, covers 13 pages, eight or more items to a page. While Mr. Hough states that

probably one-half of the export commission houses handle any and all products, it is interesting to note that of those who do state their specialties 31 ship iron and steel bars, plates, angles, beams, etc., 181 handle machinery and 11 export metals.

Mr. Hough declares that while the present tendency of American manufacturers is toward the intensive cultivation of foreign markets there is no basis of fact for any belief that the export commission house is a "back number," although their activities are more restricted than formerly, particularly in the origination of specific orders. To-day the American manufacturer has greater knowledge than ever of his foreign customer and the foreign merchant is more familiar with American products. At the same time Mr. Hough considers it important for the manufacturer to know and be on friendly terms with the exporting houses, no matter how thorough his efforts may be in foreign countries.

The directory has been enlarged in its scope and includes lists of export commission houses in cities other than New York, of manufacturers' export agencies, of bankers engaged in the foreign exchange business, dealers and brokers in foreign exchange, marine insurance companies, export trucking companies in New York, foreign freight forwarders, steamship agencies, foreign consuls in the United States and American consulates abroad. It contains a map of the export district of New York City and much other information.

Treatise on Planers. Issued by the Cincinnati Planer Company, Cincinnati, Ohio. Size, 5½ x 8¼ in.; pages, 102, cloth bound. Price, 50 cents net.

The purpose of this book is to impart practical information and suggestions for economically producing flat surfaces. The idea of the authors, all experienced men, is to present in understandable language the correct use of tools to produce the work at a minimum cost, as well as to aid in the selection of the proper machines for different kinds of work. The different subjects covered are as follows: Work that should be planed; tools for the planing machine; planing machine fixtures; principles of holding work for planing; methods of planing machine parts; planing machine fixtures and gauges; examples of practical planing machine work; spiral, radius and arc planing; handling the planing machine; cutting and return speeds and setting up a new planing machine. The volume is profusely illustrated and deals with many interesting experiments made on planers other than the company's own make.

American Car & Foundry Company's Year

The annual report of the American Car & Foundry Company shows net earnings of \$4,193,750, which are the smallest since 1909, and compare with \$6,240,324 for the fiscal year ended April 30, 1911. The charge of \$1,354,519 for renewals, repairs, etc., left a balance available for dividends of \$2,839,232, against \$4,234,789 in the previous year. After payment of dividends there was a surplus of \$139,232, against \$1,534,789 last year. There was no charge to correspond with the \$750,000 put out for maintenance and improvements in 1910-11. The surplus is \$24,876,576.

President F. H. Eaton states that the lack of railroad buying, which was a condition at the close of the previous fiscal year, had continued during the earlier part of the year just ended, but was succeeded by a buying movement which brought in a "fairly large volume."

The general balance sheet gives the value of materials on hand at \$12,439,213 at the close of the fiscal year, against \$9,103,577 at the close of 1910-11. On the other hand, cash decreased from \$7,485,429 to \$5,285,371. President Eaton explains that this is the result of the increase in buying activity and the consequent increase in materials in process of construction into cars.

The American Society of Mechanical Engineers has accepted an invitation from the Verein Deutscher Ingenieure to meet with that association in Leipzig in June, 1913. Arrangements are to be made to visit some of the large industrial establishments of Germany and the itinerary will include Essen, Düsseldorf, Munich and Berlin.

A New Combination Tool Grinding Machine

Details of the New Yankee Machine for Grinding Cutters, Reamers, Drills and General Tool Room Work

What is said to be the only machine capable of grinding drills at the same time that cutters and reamers are being ground has been placed on the market in an improved form by the Wilmarth & Morman Company, Grand Rapids, Mich. As compared with the earlier type, this machine which is known as the BX New Yankee grinding machine, has a swiveling table, while in the old one the table of the cutter grinding attachment was bolted solidly to the column and the small steel spindle head in turn was bolted tightly to the table so that it was impossible to use a cup wheel or to grind other than straight work on the periphery of the wheel. The drill grinding capacity of the machine is anything that may be desired, while that for face and side milling cutters is up to 12 in. in diameter, and that for angle and plain milling cutters is 8 in. in diameter. The ways are all fitted on the machine so that there is practically no danger from dust and the table will swivel a little more than 180 deg., thus allowing the operator to grind up or down in working on the periphery of a plain wheel or to work against the face of a cup one. The machine is illustrated in Fig. 1, while the remaining engravings show different arrangements of the machine for handling various classes of work being arranged for cylindrical and internal grinding in Fig. 2, for grinding angle and formed cutters in Figs. 3 and 4, respectively, and for straight fluted reamers in Fig. 5.

For plain cutter reamer and drill grinding, the machine is furnished with a single set of centers and a plain instead of a drum countershaft, as shown in Fig. 1, while for doing cylindrical and internal grinding a special attachment is provided and the machine is arranged as illustrated in Fig. 2. In Fig. 3 the grinding of a 45-deg. angle cutter on the face of a cup wheel is illustrated. The standard swivel with its graduated base is set at the proper degree and any angle is available. If for any particular reason or because of the personal preference of the operator it is desired to grind these cutters on the periphery of a straight wheel rather than the face of a cup one, they can be handled in exactly the same way. In this case the table can be swiveled to either side so as to provide for grinding either up or down, the former being the method recommended by the builder.

For grinding forming cutters the machine is arranged as shown in Fig. 4 and the cutter is passed under a saucer shaped wheel. The amount to be ground is regulated by the screw cross movement of the upper or cross slide which carries the swivel standard. The cutter is carried on an arbor or mandrel between the centers. When it is desired to grind straight lip or straight flute reamers on the face of a cup wheel the machine is then arranged as illustrated in Fig. 5. In addition it is possible to grind taper reamers in the same way except that the standard carrying the reamer, lip rests, center bars, etc., is swiveled to give the desired degree of taper. As is the case with angle milling cutters, it is also possible to grind reamers with a straight wheel.

Other work which can be handled by this machine is the grinding of hobs and gear cutters which is really a special application of the grinding of forming cutters as illustrated in Fig. 4. Flutes of taps are ground in the same way, the only difference being that the tap carries its own

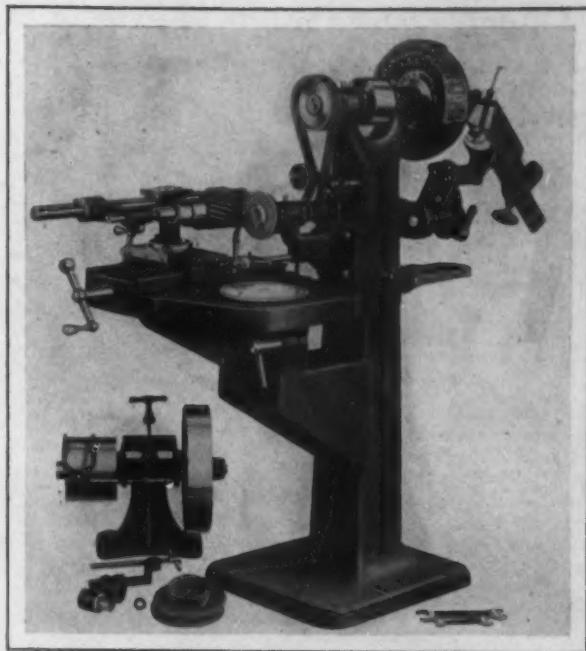


Fig. 1—The BX New Yankee Combination Cutter, Reamer and Drill Grinding Machine Built by the Wilmarth & Morman Company.

centers and no arbor is required. Face or side milling cutters are ground in the same way as the angle cutter illustrated in Fig. 3, on either the periphery of the straight wheel or on the face of a cup wheel. When this work is being done the side or face mills are mounted in the same way except that the swivel standard is placed square with the main sliding ways instead of at an angle.

For doing surface grinding, a vise which is furnished at a slight additional cost is supplied and small hardened work such as vise jaws, small tools, cutters, keys, etc., can be held therein while being ground on the face of a cup wheel. The vise is graduated to 90 deg. and can be set at any angle as it is mounted interchangeably with the regular swivel standard. If desired it can also be tilted to a point slightly beyond the perpendicular and from that back to 45 deg., and locked at that setting independently of its setting on the swivel base. The vise weighs 17 lb., and has hardened jaws, $3\frac{1}{2}$ in. long by 1 in. deep and will open to $2\frac{1}{4}$ in. These jaws can be removed and when this is done work 3 in. wide can be accommodated.

An extensive enlargement of the National Railways of Mexico system is now in progress. An official statement just issued from the offices of that company show construction work in progress and planned on a number of branch lines of 25 to 310 miles in length, making a total of 1122 miles of new track involved in their construction. It is authoritatively stated that there will be no cessation in the work until all of them are finished, which will probably be within the next three years. The building of these branches means the opening up and development of large scopes of virgin territory in Mexico and the providing of transportation outlets for sections that are now lacking in this respect.

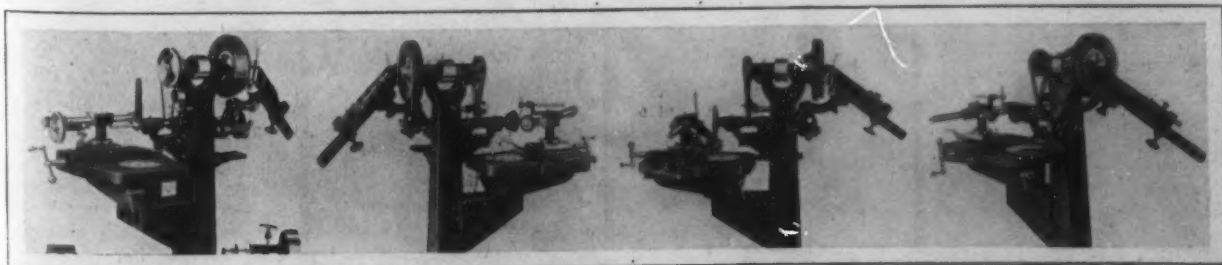


Fig. 2—With Cylindrical Grinding Attachment

Fig. 3—Grinding Angle Milling Cutters

Fig. 4—Arranged to Grind Formed Cutters

Fig. 5—Grinding Straight Fluted Reamers

Four Different Arrangements of the Machine for Handling Various Classes of Work

United States Cast Iron Pipe & Foundry Company

Annual Report Shows \$915,358 Gross Income, Against \$630,509 Previous Year, or 45 Per Cent. Increase

The thirteenth annual report of the United States Cast Iron Pipe & Foundry Company, covering operations in the fiscal year ended May 31, 1912, makes more cheerful reading for the stockholders than the report for the previous year. The income account for the two years compares as follows:

Income Account		1911-12.	1910-11.
Total earnings, after deducting cost of maintenance and operation of plants, expenses of sales and general offices and provisions for taxes and doubtful accounts.....		\$833,794	\$536,711
Other income, consisting of interest on bonds in treasury and sinking fund and other miscellaneous income.....		81,565	93,798
Gross income.....		\$915,359	\$630,509
Transferred from reserve for additional working capital.....			250,000
Total		\$915,359	\$880,509
Less:—			
Revaluations account previous year, inventories \$135,844, and accounts receivable \$48,927		184,771	.....
Reserved for improvements.....		63,700	56,140
Interest on bonds and bills payable.....		138,910	90,000
Balance		\$527,978	\$734,369
Dividends on preferred stock.....			625,000
Balance		\$527,978	\$109,369
Add previous surplus.....		144,880	35,511
Profit and loss account, May 31.....		\$672,858	\$144,880

The balance sheet, as of May 31, 1912, is as follows:

Balance Sheet	
Assets.	
Property and plant:	
To May 31, 1911.....	\$24,084,985.95
Net additions, year.....	716,912.02
	\$24,801,897.97
Treasury stock:	
4487 shares preferred, 4587 shares common, at cost.....	347,555.00
Bonds of American Pipe & Foundry Co. in treasury and sinking fund, par \$601,000; cost.....	597,050.00
Current assets:	
Cash on deposit and on hand.....	\$719,655.60
Accounts and notes receivable.....	2,268,133.57
Inventories of raw materials, manufactured product, etc.....	2,544,919.36
	5,532,708.53
Total	\$31,279,211.50
Liabilities.	
Capital stock:	
Preferred	\$12,500,000.00
Common	12,500,000.00
	\$25,000,000.00
Bonded debt:	
American Pipe & Foundry Co.....	\$1,500,000.00
Dimmick Pipe Co.....	179,000.00
	1,679,000.00
Current liabilities:	
Accounts and bills payable.....	\$1,903,233.05
Accrued taxes, interest, etc.....	84,228.62
	1,987,461.67
Reserves:	
For improvements and replacements.....	\$124,411.13
For insurance.....	100,000.00
For doubtful accounts.....	15,479.98
	239,891.11
Surplus:	
Working capital reserve.....	\$1,700,000.00
Profit and loss account.....	672,858.72
	2,372,858.72
Total	\$31,279,211.50

The accompanying remarks to the stockholders of the company by President L. R. Lemoine are in part as follows:

The President's Remarks

"Your company owns 12 plants, 11 of which are being operated to their full capacity, except as limited temporarily by unavoidable local conditions, new construction or extraordinary replacements. While the majority of your works are well located, with reference to raw material and the effective distribution of product, certain of them are handicapped by physical conditions both with respect to plant and area limitations. It is proposed, therefore, to modernize and increase the efficiency of certain of your works through the adoption of improvements in method and practice; which, with a more effective concentration of output, will, we believe, result markedly to your advantage. It is realized that there is an element of strength in the separated locations of some of your plants, and in any concentration, therefore, these advantages will be borne in mind.

CHARACTER OF PRODUCT.

"Your chief product is cast iron bell and spigot pipe, principally for water and gas mains, though it finds many other uses. It is a well tried product, in most installations having almost indefinite life; and it may be said to be the standard for water and gas in all the principal cities in this country. There are numerous instances where mains now in use have been in service for 100 years or more. Your company, however, has to meet the competition of substitutes such as steel, concrete, tile and wooden pipe, etc.; but at best, these are substitutes, most of them having their chief merit in cheapness, which is usually offset by a very short life. Hence, your company is frequently called upon to supply cast iron mains to replace these substitutes; and as a general proposition, where the installation is carefully considered from the standpoint of durability, cost of maintenance and life on an amortization basis, your product, even at a higher first cost, is found to be the better investment.

"In the manufacture of your product your company still adheres to the bell and spigot joint as the best adapted to water and gas service, subject, of course, to various modifications of detail; and it is prepared to supply pipe with other forms of joints, such as flange pipe, flexible joint pipe and certain forms of so-called iron to iron spherical joints; though it does not advocate the use of iron to iron joint pipe in that during recent years your company has been called upon to replace more or less pipe with such joints, which has not proved satisfactory in service.

"The gross income of your company for the year amounted to \$915,358.66, as compared with \$630,509.45 for the year previous. During the year your inventories and accounts receivable have been subjected to a most rigid scaling down process, and the net result is that your gross earnings have borne abnormal charges during the current year.

"As the result of new construction since your company was organized, in entirely new buildings and in additions to works, including new equipment, it may be said that most of your properties have been steadily improved; and practically all of this new construction has been paid for out of earnings. All ordinary repairs and upkeep are charged to operating; and as an offset to depreciation, as heretofore all future improvements and extraordinary replacements, in so far as may be, will be provided for through a reserve for the purpose.

BUSINESS CONDITIONS IN THE PAST YEAR.

"To some extent your earnings during the past year were affected by the unusually prolonged and severe winter, and later by flood conditions. Your total gross sales for the past year show some improvement over the year previous, but still reflect plainly the adverse commercial conditions with which nearly all industrial enterprises have contended for several years. The funds expended in the purchase about a year ago, and in the improvement of your new plant at Birmingham, Ala., did not contribute to your income this year, but it is now hoped these works will be fully operated and become revenue producing in the comparatively near future.

"The early half of the fiscal year was marked by a large falling off in the business offered your company, but during the last six months the tonnage secured was

sufficient to keep your plants fairly well occupied on orders, with the result that your company did not accumulate unsold product during the winter months to the extent that has obtained in some years. This in turn has lessened the proportion of your working capital usually absorbed in unsold stock manufactured during the winter months and made it possible for your company to purchase well ahead in pig iron and to readily take care of maturing iron obligations through the resources of your own working capital. Your accounts and bills payable represent a considerable item for pig iron, and all of your bills payable are on account of pig iron purchases. Thus your company is not at present a borrower at bank.

"That your company remains in excellent financial condition is shown by the report herewith submitted. Your working capital, as of May 31, 1912, amounts to \$3,545,246.86.

"During the past year the general offices, formerly in New York City, were removed to a building owned by you at your plant at Burlington, N. J., and while your home office continues at Jersey City, your financial, accounting, statistical, engineering, traffic, experimental, purchasing and other operating offices, in so far as practicable, are being concentrated at Burlington. The company retains at New York a local sales office, in connection with which there will be facilities for meetings of your board and executive committee. This concentration of your operating staff at Burlington will, it is believed, result in greater efficiency and a material saving."

Dump Cars for Light Service

Although the dump cars furnished by the Orenstein-Arthur Koppel Company, Machesney Building, Pittsburgh, Pa., to the British Columbia Electric Company are intended for use on street railways for conveying material from one point to another and entering warehouses and manufacturing plants to receive and deliver shipments, it is also possible to use them in manufacturing plants equipped with electric industrial railways. These cars are intended primarily for handling sand, cement, gravel and readily dumped waste material and their special advantage is that in unloading, the material is dumped so that it clears the rails.

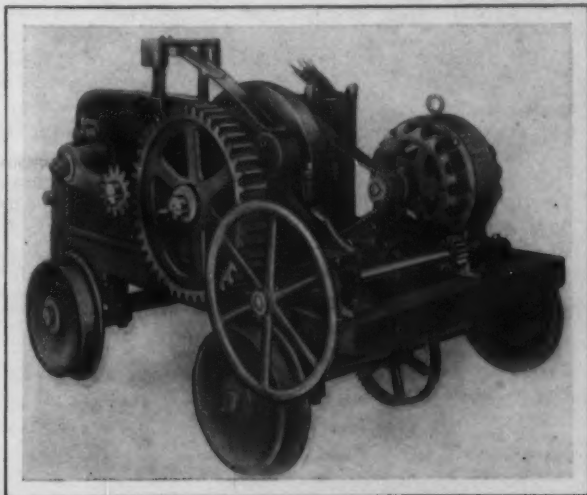
These cars are provided with three bodies which are independent of one another and enables them to be used in carrying three different kinds of material at the same time and also to dump a part of the load to one side of the track and a part to the other and to distribute the load at different points. These bodies consist of a V-shaped bucket, having cast steel cradles at each end which rest on suitable supports on the car underframe. The shape of these cradles is such that the bodies roll over to the side when being dumped and thus distribute the load beyond the rails. The bodies are held in an upright position by an automatic lock and are so arranged that when it is desired to dump the car a man standing on the side opposite to that on which it is desired to dump the material, can release the lock and with a slight push the body will roll over, thus dumping the contents. The turning of the body is said to be accomplished with but little effort, and

when it returns to the upright position the locks engage automatically, so that the body will not roll over to the opposite side.

Both motor and trailer cars are built, the one in the center of the accompanying engraving being provided with a cab at each end and supports in the center on which a trolley pole can be mounted.

A Motor-Driven Portable Shearing Machine

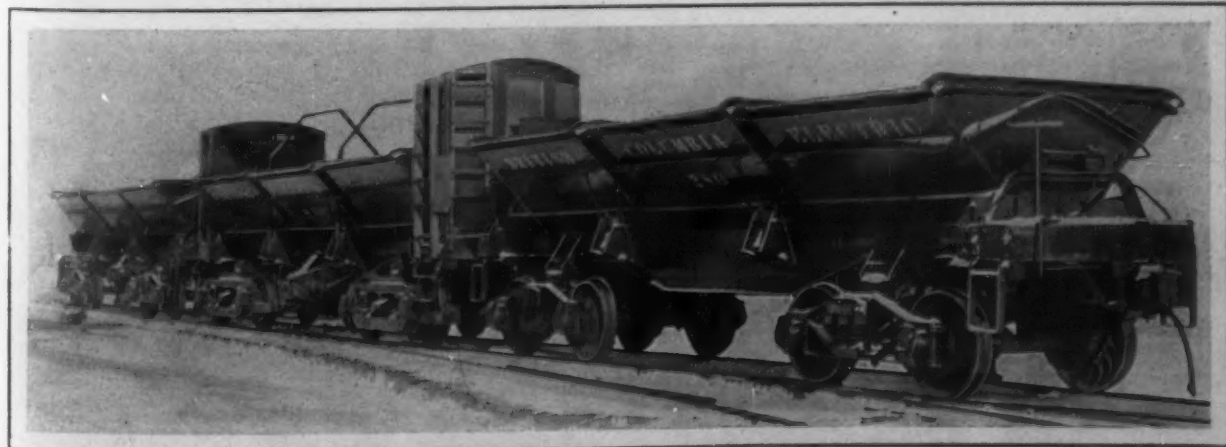
The accompanying illustration shows an interesting application of a motor used in driving a portable shearing machine mounted on a small flat car. The shear is the product of the John Evan's Sons Company, Philadelphia, and has been found a very valuable adjunct to wholesale hardware houses, factory storerooms and railroad



Motor Driven Portable Shearing Machine

shops. It is suitable for scrap yards or places where metal bars or scrap is handled. The car is designed for standard gauge track and is propelled by the hand wheel shown. The shear motor is a $7\frac{1}{2}$ hp. Westinghouse motor operating on three-phase alternating current. The current is conveyed to the motor by means of a long flexible cable, and when used over any length of track, a number of junction boxes for making connections to the motor may be installed.

The San Antonio Boiler & Iron Company, San Antonio, Tex., is preparing to move into its new shops on the International & Great Northern tracks. This company was recently incorporated with a capital stock of \$15,000 and \$10,000 paid in. Its plant will cost \$8000 and it has $3\frac{1}{2}$ acres. The building is 60 x 120 ft., 20 ft. high. The company will do a general boiler and machinery business, manufacturing boilers, stand-pipes, tanks and towers, suction and discharge pipes and locomotive tenders and will overhaul locomotives. It will install some new modern machines and a large traveling crane. John M. Wilson is president and H. C. Ruth is vice-president.



A New Type of Dump Car for Industrial and Electric Railways Built by the Orenstein-Arthur Koppel Company, Pittsburgh, Pa.

Gasoline Motor Truck Operation *

Costs for Commercial Vehicles of Various Sizes for the Year and for the Ton-Mile

BY LOUIS RUPRECHT†

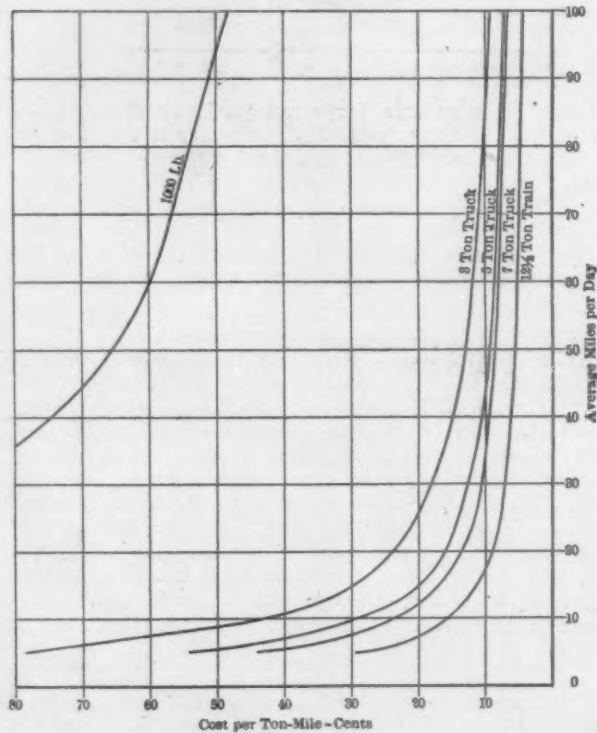
The accompanying charts of actual costs of operation, and cost per ton-mile of work of motor trucks, are a tabulation, for convenient reference and study, of trucking economy under varying conditions of loads and mileage. They are intended more as a comparative study than a discussion of specific costs, but it is nevertheless in order to review the detailed figures used in arriving at the total costs for plotting curves.

Depreciation is figured at 10 to 15 per cent., varying according to mileage and the size of the units, the tire value being deducted from the cost of the complete vehicles. One of the highest-priced types of truck is assumed in each case. The depreciation figures are based on experience with hundreds of this type of truck in use over a long period of years, in many instances longer than ten years. It is only fair to say that the depreciation of the newer, more flexible models will be less than that of the older ones.

Drivers' wages on 1000-lb. delivery wagons are taken at \$2.75 per day, and on trucks \$3 to \$4 per day according to size and length of day's work. Helper on trailer \$1 per day. These figures in the case of a very large day's work might conservatively be figured a trifle higher.

Garage charges include only washing and storing of the vehicle: \$240 to \$300 per year according to size.

Tire cost is based on prices to user and 8000 miles life as guaranteed by makers. The sizes figured are all in



Costs of Various Size Motor Trucks per Ton-Mile

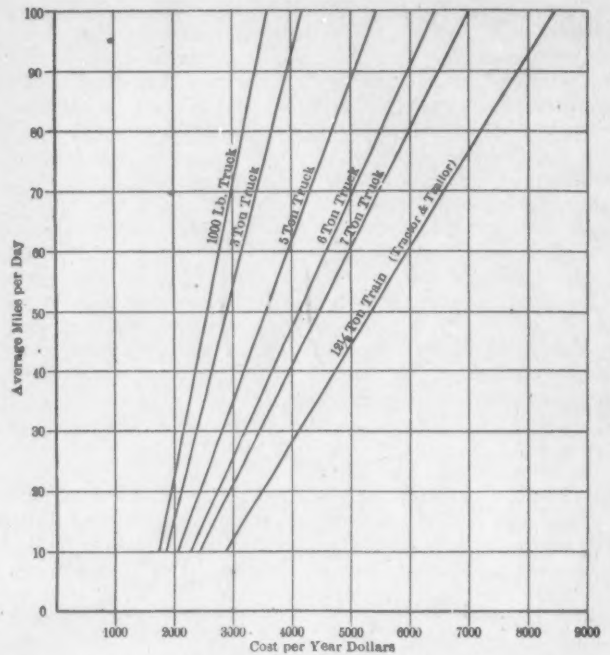
accordance with the makers' specifications based on weights of vehicles and loads, and therefore this large item of expense is figured conservatively.

Gasoline cost is taken at 11 cents per gallon. The price at this writing is a little higher, but only 3 to 6½ miles per gallon is assumed as the performance according to size of vehicle.

Oil cost is taken at 30 cents per gallon; 50 to 125 miles per gallon according to size of vehicle.

Insurance: \$100 to \$250 per year according to size.

Repairs and replacements have been figured, up to 3



Annual Costs of Hauling with Different Size Motor Trucks

cents per mile in the case of heavy trucks. This is based on extensive records.

Operating days per year have been taken uniformly at 300. This figure is a trifle high, particularly in cases where large daily mileages are made, although it leaves 65 Sundays and holidays for the upkeep of the equipment.

Attention is now called to the first set of curves showing the actual costs of hauling, expressed in dollars per year, for different sizes of units for varying average daily mileage. It so happens that on the basis of the figures the plotted costs are straight lines in every case. This indicates that the total costs increase in constant ratio with the daily mileage. These straight lines if continued to zero miles should indicate theoretically therefore the fixed and other charges against the equipment when idle, and in fact this is approximately the case; for it will be found that costs thus indicated at zero miles are practically the sum total of depreciation, interest, part-time wages, dead storage, insurance, tire depreciation, etc., actually chargeable against a vehicle temporarily out of commission.

Rule for Ascertaining Daily Cost

This situation has suggested a convenient thumb-rule for figuring costs of operation, making unnecessary the use of this chart, as follows:

Cost per Day = "Fixed charges" + (Miles per Day × Daily Increment in cost).

Size.	Fixed Charges.	Increment Per Mile.
1000-lb.	\$5.07	\$0.0686
3-ton	5.33	.0860
5-ton	5.60	.1253
6-ton	6.00	.1540
7-ton	6.15	.1718
12½-ton train	7.40	.2070

For example, the cost of operating a 6-ton truck, all charges included, 45 miles per day, will be $\$6.00 + (0.1540 \times 45) = \12.93 . Costs per ton-mile can of course be derived similarly without reference to the second set of curves, for these costs have been derived from the first set of curves.

In computing costs per ton-mile it is assumed that vehicles are fully loaded half the total daily distance traveled, or, what is equivalent, that vehicles carry half their rated capacity load the full distance. If they carry more than this the cost per ton-mile would be correspondingly reduced below the figures of the curves. For instance, with full load the entire distance, the cost per unit of work would be reduced almost one-half, because depreciation, repairs and renewals and fuel per loaded mile are somewhat greater than per dead mile.

A study of these curves reveals the large reduction in cost per unit of work by increasing daily performance as follows:

*Paper read before the Detroit meeting of the Society of Automobile Engineers.
†Manager of Sales Commercial Vehicle Department, Daimler Import Company, New York City.

Increasing Daily Mileage		Reduction in Cost Per Cent.			
From.	To.	3-ton.	5-ton.	7-ton.	12½-ton train.
10	20	44	44	44	44
20	30	25	20	21	20
30	40	17	17	12	11
40	50	14	14	10	10
50	60	10	8	8	9
60	70	7	6	4	5
70	100	12	8	11	10
40	100	38	32	30	30

In other words, increasing the daily work from 10 miles daily average to 20 reduces the cost per ton-mile, or per unit of work, 44 per cent. in all cases. Then increasing the daily work to 30 miles another reduction of 20 to 25 per cent. in cost per unit of work is effected. And increasing from 30 to 40 miles per day 11 to 17 per cent. reduction in cost is effected. Substantial gains in economy are made by further increase in daily mileage; increasing from 40 to 100 miles per day, for instance, effects a reduction of 30 to 38 per cent. in cost per unit of work.

These curves are impressive as indicating the economies to be effected by proper routing of vehicles for maximum daily work. The costs, as above mentioned (being based on loads one way only), can be very materially reduced if merchandise or material can also be carried over some of the "dead-mileage" assumed in these computations.

The approximate parallelism of the curves indicates that whether light trucks, heavy trucks, or trucks and trailers are employed, economy increases with increased daily mileage at about the same rate with all these sizes of units.

These curves are also of interest and assistance in studying the question of sizes of units to be used for any particular class of work. They show, for instance, that a 12½-ton train (7-ton truck with 5½-ton trailer), operating 70 miles per day and loaded only one way, will carry one ton of load one mile for 5 cents, whereas the same one ton carried one mile in smaller units operating 70 miles per day would cost 16¼ cents on 3-ton, 8 cents on 5-ton and 7½ cents on 7-ton units; thus indicating the tremendous advantage of using large capacity units and frequently trailers wherever large tonnage is available. They also show, for instance, that the same economy, viz., 10 cents per ton-mile, is obtained by operating a 3-ton truck 84 miles, a 5-ton truck 44 miles, a 7-ton truck 35 miles, or a 12½-ton train only 18 miles per day.

The proper routing of heavy transfer units and of lighter distributing units, the adoption of correct sizes of units for such service, or for pure straight haul service, the proper load handling facilities, are all problems which frequently require careful study, always with an eye to the practical conditions of each particular service, to obtain maximum efficiency and economy. Many an installation in the past might have been saved from economic and mechanical failure with more careful study of these conditions.

An Ice Cooled Sanitary Drinking Fountain

The accompanying cut shows a bubbling drinking fountain with arrangement for cooling the water by ice in a cooling tank forming part of the apparatus. The ice cooling tank, which has a thick cork packed jacket, is equipped with a coil of brass pipe, and both supply and waste pipes pass within the tank. The apparatus has a 1½-in. pipe standard and the waste bowl is of cast iron with vitrified porcelain enamel on the inside. The water supply is controlled by a Bashlin nickel-plated self-closing bibb and the water is furnished through a Keith Boston bubbler which regulates within the bubbler the height of the flow of water. The height of the water, after adjustment to the height desired, remains essentially constant, and is regulated so that all disposition to get the mouth of the appliance itself is easily frustrated. The tank is of galvanized iron. The total height of the apparatus is 42 in. for adults and 36 in. for children.



Ice Cooled, Bubbling, Drinking Fountain.

The outside diameter of the tank is 16½ in. and the inside diameter 12 in. The height of the tank inside is 16 in.

The apparatus is manufactured by the Manufacturing Equipment & Engineering Company, Boston, Mass.

Arbor Press Safety Device

A new type of safety counterweight for balancing the handle of an arbor press is being applied to the Greenerd line by its builder, E. E. Bartlett, 326 A street, Boston, Mass. This device was the result of the experience of several users of arbor presses who found that when the



The No. 5 Greenerd Arbor Press with Safety Counterweight Built by E. E. Bartlett, Boston, Mass.

handle was pulled forward the center of gravity was so changed that the counterweight was not sufficiently heavy and in a number of instances the handle fell forward and struck the operator a severe blow.

The first modification of the ordinary type of counterweight was made by a customer who bolted a piece of metal on the weight, putting the additional material in the proper spot to overcome any tendency of the handle to fall. The new counterweight is an improvement upon this arrangement and by its form and position accomplishes the desired purpose, it being emphasized that the danger from the falling of the lever is entirely eliminated. While this counterweight is being furnished for all the new presses built, all the users of arbor presses equipped with the old style counterweight can have a new one supplied at cost.

Construction work on the new plant of the Lounsbury & Riley Machine Works, Inc., New Haven, Conn., which is being erected on Shepard street, near the terminal of the Shelton avenue trolley line, is making good progress. The factory site was purchased some time ago and the cost of the plant with the equipment will probably approximate \$12,000. It will be devoted exclusively to manufacturing. The company reports a large number of orders on hand, with prospects of an active season. The business was founded about five years ago by Mr. Lounsbury. Later a corporation was formed with Mr. Lounsbury president and F. C. Riley treasurer. Its trade has had a rapid growth, and each year it has been able to double its capacity. The company will move from the present quarters, which have been outgrown, into the new shop some time in the coming month.

The Henderson-Willis Welding & Cutting Company on July 1 moved into its own building at 2826 Locust street, St. Louis, Mo.

The Car Wheel Situation

Some Comments on the Recent Action of the Master Car Builders' Association

At the recent Atlantic City meeting of the Master Car Builders' Association the Committee on Car Wheels presented a progress report. It recommended some minor changes in present specifications for chilled cast iron wheels, but did not adopt the recommendations of the Association of Manufacturers of Chilled Car Wheels that there be a revision of the weights of wheels for cars of 80,000 lb. capacity and that the M. C. B. wheel specification be revised to include wheels for cars of 140,000 lb. capacity. Concerning steel wheels the committee reported that a number of questions relating to the chemical and physical properties of carbon and alloy steel, and the method of treating and handling the steel in its process of manufacturing are now being investigated, and that on this account the committee thought it unwise to recommend a standard specification at this time, governing the quality of material or the method of manufacturing solid steel wheels. Commenting on the report and the present status of the wheel question, the Railway Age Gazette says:

The Conservatism of the Master Car Builders

"Very early in the report there is given the reason for refraining to offer a standard specification for solid steel wheels, because 'the art of manufacturing solid steel wheels is yet in a process of development.' In marked contrast to this conservative position is the action of the Society for Testing Materials, which is shown in the two appendices, where the process of manufacture, as well as the product, is hedged in as though everything pertaining thereto had been so thoroughly completed that nothing more remained to be done in the way of experimentation, and the last word has been said, it being merely necessary now to protect the buyer from the unscrupulous manufacturer. This position of conservatism is, however, quite characteristic of the Master Car Builders' Association. It is holding off more and more from chemical analyses and matters that may control methods of manufacture and simply asks for results, leaving manufacturers to attain those results, which are mechanical, in any way that may seem best.

"Again, the committee touches gingerly on a point that has been under consideration for a number of years, but regarding which nothing has, as yet, been done. It is recognized that all metals, and especially all wheels, whether they be of cast iron or of solid steel, are subjected to internal stresses inherent in the method of manufacture, but of whose character or magnitude we know nothing. The matter was upon the point of being subjected to a critical investigation and analysis a number of years ago, but was stopped by commercial changes, and so has not been touched. It is practically certain, however, that something will be done during the coming year in the way of determining what these internal stresses are both in magnitude and direction, and it was this that the committee probably had in mind when it framed the paragraph to which allusion is made. Whether the committee will carry on any investigation itself is not hinted, but it is to be hoped that it will. That any method of inspection can be developed that will detect and measure these stresses without the destruction of the wheel is doubtful, but if it could be done it would be of incalculable benefit to every user and maker of car wheels in the country.

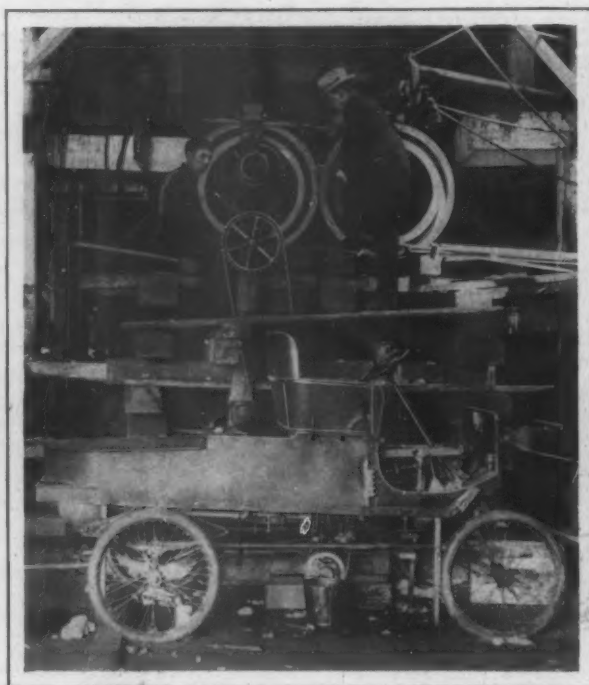
"A broader and more far-reaching problem is that of increasing the strength of the cast iron wheel flange by increasing its thickness, and here the committee acknowledges its helplessness. To add metal here involves frog and crossing clearances, over which the association has no jurisdiction and which can only be done with the co-operation of the American Railway Engineering Association and the approval of the American Railway Association. It may involve such large expenditures for changes as to be impracticable, and the best to be expected in this direction for some time to come will be repeated reports of progress, when, in many cases, no progress has been made.

"Another point on which nothing has been done is in the design and specification of a wheel for a car of 140,000 lb. capacity. In view of the criticisms that have been made of the cast iron wheel for cars of 100,000 lb. capacity, it rather takes one's breath away to think of adding 40 per

cent. to the nominal capacity and probably 30 per cent. to the actual wheel loads that have already caused so much anxiety. Whether that anxiety is needless or not, need not be discussed here. Evidently the manufacturers will not fail to try to furnish a wheel suitable for high capacity cars, and it will be interesting to know what manner of wheel this will be that will carry a wheel-on-rail pressure of 25,000 lb. or more."

Boring Cylinders with an Automobile

The Mississippi Foundry & Machine Company, Jackson, Miss., was recently called on to bore out the hydraulic water cylinders for a cotton compress located at Yazoo City, Miss. The cylinders were 27 in. in diameter and made of cast steel. In order to do the work it became necessary to rig up a special arrangement for furnishing power to operate the boring bar, as there was no



Automobile Serving as Source of Power for a Machining Operation.

steam or electric power to be had in the plant. The problem was solved by using a White steamer as shown in the photograph. The engine was connected up with the boring bar by means of sprockets and chain, and carried the job successfully through to completion without a hitch. The time required to bore out the cylinders and packing grooves was 101 hr.

The plant of the Youngstown Iron & Steel Company, Youngstown, Ohio, maker of black and galvanized sheets, steel roofing and fireproofing and pressed steel specialties, will be closed the first two weeks in July to make needed repairs. The shut down will be as brief as possible, as the company is crowded with orders.

At a conference held in Pittsburgh on Tuesday between the foundry operators and the molders, the latter agreed to accept a general advance of 25 cents, or from \$3.50 to \$3.75 per day, for molding on a nine-hour basis, the advance to date from July 1. In the latter part of May the molders made a demand for 50 cents, but this was afterward withdrawn.

The United States District Court at Baltimore, Md., refused the petition of the Alabama Consolidated Coal & Iron Company for an injunction to restrain the Baltimore Trust Company from selling \$1,250,000 of refunding bonds pledged as collateral to secure a note of \$330,000. The validity of the bond issue was affirmed by the court. It is stated that the Baltimore Trust Company will again advertise the sale of the collateral.

Wrought Iron Pipe vs. Steel Pipe

The Reading Iron Company, Reading, Pa., has brought out the tenth edition of its presentation in the case of "Wrought Iron Pipe vs. Steel Pipe." This publication is a pamphlet of 48 pages, in the form of a legal document, being entitled the "Paper Book of Plaintiff" in the "Court of Actual Experience," the district being the United States of America, the term 1886-1912, the "Hon. Pipe Consumer" the judge and the Reading Iron Company attorney for the plaintiff. Exhibit A is a photographic reproduction of a piece of iron casing of the Reading Iron Company's make, after 21 years' exposure, or from 1887 to 1908, and exhibit B is a similar reproduction of a piece of steel casing after 11 years' exposure, or from 1897 to 1908. The iron casing shows very little corrosion, while the steel casing is practically destroyed.

The preface to the tenth edition discusses the claims for rust-resisting qualities of the products which have recently come on the market named "open-hearth iron," "ingot iron," etc., asserting that these so-called pure irons are nothing more or less than very mild and soft steel, i. e., a steel which is very low in carbon, manganese and other metalloids or impurities. The pamphlet says: "The superiority of wrought iron over steel in its resistance against ordinary corrosion is due entirely to its physical structure, with its inclosed cinder fibers. This fibrous structure can never be imitated by any steel refined in a fluid state, no matter how soft it may be." The accelerated corrosion test is also attacked. It is interesting to observe that the preface says, "In further evidence of the superior merits of genuine wrought iron pipe it may be stated that the majority of the modern and most prominent buildings in New York City are equipped with Reading wrought iron pipe."

The book proper begins with an argument in the general case, which is followed by numerous pages of testimony gathered from the experience of consumers of pipe. A chapter is given to the nomenclature of wrought iron and steel, one to accelerated corrosion tests, and another to physical tests. The difference between wrought iron and low carbon steel is shown in microphotographs in a chapter entitled "The Reason Why." In an appendix extracts are given from articles which have been printed in various technical journals discussing the subject of corrosion of iron and steel.

From the concluding chapter the following extracts are taken: "We are aware of the fact that some conscientious investigators have put short pieces of wrought iron pipe and steel pipe into the same service line and after some years' use have found no difference in the corrosion, and then have made these tests the basis of their essays, saying that there is no difference, but the trouble is that they have experimented with entirely too small a quantity. Owing to the great variation in the behavior of steel in its resistance against corrosion, it is easily possible that a few pieces of steel pipe may resist corrosion very well, while another lot of pipe made from the same ingot may fail very much sooner. As stated on pages 7 and 27, out of two parallel pipe lines, one of wrought iron and one of steel, 11 miles of the steel pipes were still in good condition after 11 years' service, while some of the wrought iron pipes were corroded in 18 years' service, yet the total damage done by corrosion on the steel pipe line in 11 years was over 55 times greater than the damage done on the wrought iron pipe line in 18 years' service." "Some so-called wrought iron pipe is made of junk yard scrap, which, owing to the large proportion of miscellaneous steel being mixed with it, is not as durable as wrought iron made from pig iron by the old-style puddling process. If you want the best pipe, specify 'genuine wrought iron pipe made from puddled pig iron,' and have the pipe-fitter furnish you the name of the manufacturer; or, if the size of the contract warrants it, send an inspector to the works and see that the pipe is made of the proper material." "The Reading Iron Company is the largest manufacturer of wrought iron pipe in this country. We are consuming the output of a total of 118 double, equal to 236 single, puddling furnaces, of a total annual capacity of approximately 170,000 tons of puddle bars."

In connection with the document above referred to, the Reading Iron Company is distributing the pamphlet entitled "Iron and Steel," by its general manager, George

Schuhmann, brought out several years ago, which is one of the most concise descriptions of the various processes of manufacturing iron and steel ever prepared, and given in language comprehensible by the non-technical reader.

May Iron and Steel Exports and Imports

Exports Make a New High Record

The report of the Bureau of Statistics of the Department of Commerce and Labor for May shows a further increase in the exports of iron and steel. The imports also show an increase as compared with April, but the figures for 11 months of the current fiscal year show a marked falling off as compared with the corresponding period of the previous year. The total value of the exports of iron and steel and manufactures thereof, not including ore, in May was \$28,050,247 against \$26,789,853 in April. The value of similar imports in May was \$2,487,446 against \$2,058,945 in April.

The May exports of commodities for which quantities are given totaled 307,654 gross tons, against 267,210 tons in April. Details of the exports of such commodities for May and for 11 months of the current fiscal year ended with May are as follows, compared with the corresponding periods of the previous year.

Exports of Iron and Steel.

Commodities.	May		Eleven months	
	1912. Gross tons.	1911. Gross tons.	1912. Gross tons.	1911. Gross tons.
Pig iron	28,154	6,273	158,831	145,063
Scrap	10,383	10,351	74,938	53,764
Bar iron	2,563	1,456	14,302	16,675
Wire rods	6,977	2,224	42,935	17,029
Steel bars	15,772	11,243	131,174	111,347
Billets, ingots and blooms.	36,070	21,520	210,581	167,718
*Hoop band and scroll	1,234	.....	7,438	.....
Steel rails	60,306	36,900	369,226	359,157
Iron sheets and plates....	20,366	8,454	166,953	92,610
Steel sheets and plates....	33,544	18,768	250,511	182,440
Tin andterne plates.....	10,218	4,654	71,976	27,141
Structural iron and steel..	23,137	18,450	219,534	156,331
Barb wire	10,604	7,979	75,463	67,853
All other wire	17,344	10,073	128,874	100,067
Cut nails	1,414	1,047	10,106	9,504
Wire nails	5,448	3,213	57,872	46,850
All other nails, including tacks	1,114	1,236	11,536	11,289
Pipe and fittings.....	22,767	14,500	210,712	164,011
Radiators and cast-iron house heating boilers....	239	242	3,750	3,422
Totals	307,654	178,583	2,216,712	1,732,271

*Included in "all other manufactures of" from July 1, 1910, to June 30, 1911.

The imports of commodities for which quantities are given totaled 15,949 gross tons in May, against 12,479 tons in April. Details of the imports of such commodities for April and for 11 months of the current fiscal year ended with May are as follows, compared with the corresponding periods of the previous year:

Imports of Iron and Steel.

Commodities.	May		Eleven months	
	1912. Gross tons.	1911. Gross tons.	1912. Gross tons.	1911. Gross tons.
Pig iron	8,049	12,273	100,969	187,095
Scrap	3,234	2,572	13,068	24,167
Bar iron	1,935	2,850	20,990	28,134
Billets, bars and steel plates, n.e.s.	988	2,029	27,062	36,192
*Structural iron and steel....	139	.....	2,801	.....
Sheets and plates.....	86	196	2,312	3,454
*Steel rails	308	.....	2,989	.....
Tin andterne plates.....	108	2,198	2,796	40,874
Wire rods	1,102	1,227	12,884	16,627
Totals	15,949	23,345	185,871	336,543

*Included in "all other manufactures of" prior to July 1, 1911.

The imports of iron ore in May were 194,482 gross tons, against 178,502 tons in April and 217,467 tons in May, 1911. The total quantity of iron ore imported in the 11 months of the current fiscal year ended with May was 1,824,128 gross tons, against 2,015,337 tons in the corresponding periods of the previous year. Of the imports in May 111,220 tons came from Cuba, 52,192 tons from Sweden, 25,040 tons from Newfoundland, 5280 tons from Canada and 750 tons from other countries.

The total value of the exports of iron and steel and manufactures thereof, excluding ore, in 11 months of the current fiscal year ended with May was \$243,357,460, against \$210,415,299 in the corresponding period of the previous year. The total values of similar imports were, respectively, 24,098,114 and \$31,428,250.

S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

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W. H. Taylor . . . President and Treasurer
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M. C. Robbins . . . General Manager

Editors

Geo. W. Cope A. I. Findley W. W. Macon

Charles S. Baur . . . Advertising Manager

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CONTENTS.

Construction of Machinery Foundations.....	1
Workmen's Daily Time Slips.....	5
Coal Merger Proposed at Pittsburgh.....	5
An Arrangement for Casting Small Ingots.....	6
Coal Purchases Under Specifications.....	7
The American Bridge Company's Gary Shops.....	8
The Cement Industry in 1911.....	15
Door Veneering Machine.....	15
Car Surplus Still Shrinking.....	15
Varied Uses for the Drilling Machine.....	16
New Alternating-Current Flame Arc Lamp.....	17
The Columbus Machine & Tool Company.....	17
The Economical Use of Process Costs.....	18
Solving the Smoke Problem.....	19
Plant at Oakley, Ohio, for Making Conveyors.....	20
Cylinder Boring and Milling Machine.....	22
A Mammoth Ratchet Wrench.....	23
A Universal Coil Making Machine.....	23
The 300,000-hp. Keokuk Power Development.....	23
Success with Bonus Wage Payments.....	24
Cramp Shipbuilding Company's Year.....	25
Brass Melting Furnaces.....	25
Wear of Conveyor Belts.....	26
New Publications.....	28
American Car & Foundry Company's Year.....	28
A New Combination Tool Grinding Machine.....	29
United States Cast Iron Pipe & Foundry Company.....	30
Dump Cars for Light Service.....	31
A Motor-Driven Portable Shearing Machine.....	31
Gasoline Motor Truck Operation.....	32
An Ice Cooled Sanitary Drinking Fountain.....	33
Arbor Press Safety Device.....	33
The Car Wheel Situation.....	34
Boring Cylinders with an Automobile.....	34
Wrought Iron Pipe vs. Steel Pipe.....	35
May Iron and Steel Exports and Imports.....	35
The Steel Industry and New Capital.....	36
The Eight-Hour Law and the Metal Trades.....	37
The Advance in Puddlers' Wages.....	37
Machine Tool Prices Past and Present.....	38
Handling Light Repairs in the Tool Room.....	38
Correspondence.....	38
The American Iron and Steel Institute.....	39
Large Steel Corporation Equipment Orders.....	39
Sheet and Tin Plate Scale Settled.....	39
The Imataca Iron Mines.....	39
Blast Furnace Statement.....	40
Remarkable Durability of a Ball Bearing.....	41
Blast Furnace Notes.....	41
The Iron and Metal Markets.....	42
Personal.....	54
Obituary.....	55
Pittsburgh and Vicinity Business Notes.....	56
New Steel Casting Plant.....	56
Customs Decisions.....	56
The Stitz Fuel Oil Burner.....	56
The Machinery Market.....	57
Baltimore Industrial Notes.....	65
Trade Publications.....	65

The Steel Industry and New Capital

Some of the financial columns have remarked on the amount of new capital raised for the steel industry since the beginning of the year, in the face of the continued complaint of small earnings by steel companies. It is stated that \$53,700,000 of new capital has been provided for thus far in 1912, to be at the disposal of various steel companies, chiefly for construction work and the acquisition of new property. Of this amount the United States Steel Corporation secured \$30,500,000 and of the remainder \$15,200,000 represents the Bethlehem Steel Company's financing. A considerable part of these Bethlehem bonds, which were sold to bankers recently, was for refunding purposes; but provision has also been made for further improvements, and it is known that a part of the \$8,000,000 of new financing credited in the above estimate to other independent companies will be used for new work. The Republic Iron & Steel Company, for example, will apply all the proceeds of \$2,000,000 of bonds sold this year to improvements, and the Inland Steel Company will so use a large part of a \$1,500,000 issue, which is part of the \$10,000,000 recently authorized.

We may attribute to the concentration of so great a part of the country's steel business in the hands of large companies—and in this designation most of the so-called independent interests are included—this ability to finance large extensions to capacity in a year marked by meager earnings on iron and steel stocks. Back in the '90s, when scores of weak concerns were struggling through the aftermath of the panic of 1893, there was little money available for new iron and steel works. Some new capacity was built in the Pittsburgh and Valley districts, but this was the exception. And when the boom of 1899 came on, it found the steel companies all unprepared to cope with it. To-day, in the midst of unsatisfactory conditions, so far as present and immediately future earnings are concerned, such is the strength of the large steel interests and such the confidence that the country's latent steel consuming power will soon materialize in a strong forward movement, that capital is available in large sums for important extensions.

In the Central West the new open-hearth steel capacity now under construction or on which work will soon begin, will add fully 2,250,000 tons a year to the country's output of such steel. The capital going into these extensions is certainly not attracted by the scale of profits realized in the industry in the past twelve months. Back of it must be the expectation that with the disappearance of any control of market prices there will be a return to the old alternation of feast and famine, and that the five years of leanness now coming to an end will be succeeded by a period of large demand and good profits. Such an expectation is not unreasonable. Consumers of steel need not expect the pendulum to swing to the low points reached in November, 1911, and the three months following, without a compensating swing to high levels. And when the 150c. basis for finished steel comes again, shall we not assume that any co-operative effort by producers to limit the rise will be held by the Federal powers to be as much in restraint of trade as similar efforts to check the fall of prices in these recent years? But perhaps, in view of the past year's record, the assumption of any attempt by producers to restrict advances and profits on the next boom is entirely too violent to be entertained.

The Eight-Hour Law and the Metal Trades

A careful scrutiny of the new national eight-hour law seems to reduce its application as between the Government and business houses principally to large work such as buildings, warships, docks, dredging and the like. Apparently the law makes sharp distinction between a contract and a purchase. And as there must be a contract in order to compel the eight-hour provision, and as most business is put under the class of purchases, the restriction in application is evident. Even if this distinction is not held to exist, the exemptions named in the law include a very large percentage of business transacted between the manufacturers and the government. Section 1 of the act provides:

That every contract hereafter made to which the United States, any Territory, or the District of Columbia is a party, and every such contract made for or on behalf of the United States, or any Territory, or said District, which may require or involve the employment of laborers or mechanics shall contain a provision that no laborer or mechanic doing any part of the work contemplated by the contract, in the employ of the contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight hours in any one calendar day upon such work.

The first part of Section 2 may be termed the exemption clause. It provides:

That nothing in this act shall apply to contracts for transportation by land or water, or for the transmission of intelligence, or for the purchase of supplies by the Government, whether manufactured to conform to particular specifications or not, or for such materials or articles as may usually be bought in open market, except armor and armor plate, whether made to conform to particular specifications or not, or to the construction or repair of levees or revetments necessary for protection against floods or overflows on the navigable waters of the United States: *Provided*, That all classes of work which have been, are now, or may hereafter be performed by the Government shall, when done by contract, by individuals, firms, or corporations for or on behalf of the United States or any of the Territories or the District of Columbia, be performed in accordance with the terms and provisions of section one of this act.

In the wording of the clause the exemption applies to "contracts for transportation" or the "purchase of supplies," materials and articles, except armor or armor plate. The exception is significant in itself; for if armor plate is rated as a purchase and not as a contract then all iron and steel products purchased by the Government are similarly classed. An order is a contract in law. Should the act be so construed as to require that certain classes of purchases be put through as contracts, then each order must contain the eight-hour provision as a warning to prospective bidders.

If the attempted distinction between a contract and a purchase is not allowed, a great deal of importance may be attached to the meaning of the phrase "in open market," and to the other phrase "whether made to conform to particular specifications or not." The latter suggests an order given to a manufacturer for supplies or materials or "articles"—a very broad term—he to furnish them according to Government specifications, even where the specifications differ widely from those which are considered standard in the market. In other words, the goods must be made to order. All classes of mill supplies seem exempt. As for machinery, power plant equipment and the like, the question is interesting, with the answer in favor of the manufacturer in most cases. Standard machinery must certainly be classed with such "articles as may usually be bought in open market," and presumably the more special machinery, built to order, would be included un-

der the provision for conformity to "particular specifications."

If either interpretation of the exemption clause is the correct one, the builders of machinery will not be affected in the least where purchases are made by the Government. However, if equipment is furnished under a sub-contract, it may come within the new law, as would appear from the wording of Section 1 quoted above.

Some questions are raised by the exceptions to the exemptions. The Government has from time to time built a good deal of machinery in the shops of its arsenals and navy yards. Is a metal working machine, therefore, included in "work which has been performed by the Government"? If it is, it is not exempted. It seems hardly possible that the officials at Washington could take such a view of the case. One might as well argue that because the Government has raised hay for its horses at forts and army posts, the farmer must put his workmen on an eight-hour basis if he is to supply the army or navy with the products of his land. A wide range of discretion on the part of those who will carry out the law is made possible, for it may be construed to have many different meanings.

The act does not state that a man employed by a contractor on Government work shall work eight hours a day and no more, but that he shall not be required or permitted to work "more than eight hours in any one calendar day upon said work." Apparently he can put in a longer day, if the remaining time is on some other work. In a 10-hour shop a workman could legally be employed eight hours on a Government contract and two hours on another job. Such a division of working hours in a shop would be disorganizing, to be sure, but less so than if men were compelled to leave their employment each day at the end of eight hours.

Manufacturers will be slow to seek Government work until they have been assured of the interpretation to be given the law at Washington. Few could afford to change the working hours of an entire establishment for the sake of an occasional Government contract. Few bodies of workmen would desire the change, because their earnings would naturally be lowered. Moreover, from their point of view, the wording of the law is distasteful in that it restricts employment to "eight hours in any one calendar day," which renders it impossible to arrange a schedule of hours to include a Saturday half holiday.

The Advance in Puddlers' Wages

The advances recently granted to the two organizations of puddlers in the Central West are significant as well as interesting. By the Buffalo settlement of June 22 between the Western Bar Iron Association and the Amalgamated Association, afterward accepted by other manufacturers, a base rate was established of \$5.25 for puddling when the ascertained average realized price of bar iron is less than \$1.05c. with an increase of 15 cents in the puddling rate for every twentieth cent advance in bar iron. By the scale since arranged between certain iron mills and the United Sons of Vulcan a flat rate of \$6 is arranged. This is probably the first time that two distinct puddling scales have been recognized in union mills. It would seem strange that there should be two rates. The explanation seems to be simply that the Amalgamated Association, having long held the belief that there should be a measure of co-operation between employers and employees, adheres to the idea of a sliding scale,

while the rival puddlers' organization prefers a flat rate. Each organization presented its own demand, and the mills agreed to the respective demands. Neither association would be willing to accept the scale of the other. The Amalgamated scale is \$5.25 on one cent bar iron, \$5.40 on 1.05-cent bar iron, \$5.55 on 1.10-cent, \$5.70 on 1.20-cent, \$6 on 1.25-cent, and so on up. The last settlement was on the basis of 1.15 cents, but it was very nearly 1.20 cents and the next settlement is expected to bring 1.25 cents. If bar iron should average higher than 1.25c. during the twelve months just begun, the Amalgamated puddlers will receive the higher wages; if it averages below 1.25c., the United Sons of Vulcan will receive the higher wages.

It is many years since the base rate for puddling has been higher than \$5. The scale which just expired was \$5 on one-cent bar iron, with a 12½-cent increment for each twentieth cent, so that the Amalgamated Association advance is 25 cents in the base rate, and a change in the increment from 12½ cents to 15 cents. During the past ten years the base rate has been \$5, with the single exception of 1904-5, when it was \$4.90, but the point at which the rate started to advance has varied. The scales adopted in 1902, 1903, 1905, 1906, 1908 and 1909 granted no advance until bar iron had advanced a point above 1.20 cents, while the 1904 scale, starting with \$4.90, did not advance until 1.40 cents was reached, the rate then being \$5.12½. Many years ago bar iron was expected to sell at about a cent a pound, raw materials being cheap, and in later years the average price has been such that when no advances occurred until 1.25 cents or 1.30 cents was reached the average wages were little above the base rate. The new rates are obviously materially higher.

It used to be thought that the puddler's occupation was gone, but the ranks of the puddlers thinned out as rapidly as the demand decreased, and the new demand for puddled iron, grown up in the past few years and since puddled iron yielded to soft steel for the majority of purposes, is quite hardy.

It is interesting to reflect that the Amalgamated Association wage settlements this year were reached merely by single conferences with the respective manufacturers and no friction was apparent. Twenty years ago it was different, for then the Amalgamated Association claimed jurisdiction over nearly all the mills of the Central West, and the mills and the men were far apart. The differences at Homestead led to a conflict which is still well remembered.

Machine Tool Prices Past and Present

A machine tool builder has made an investigation of the variations in price over a period of years of a standard type which his house has been building for a long time. The results are interesting, and point a moral. His figures go back nearly 25 years. Taking the price received for the machine in 1888 as 100, that of today for the same machine in its improved form is a fraction over 111, an increase of only 11 per cent. The company is one of the most substantial in the country, and is well known as demanding a profit earning price and adhering to it. No correction need be made for charging below the current market for machinery.

In 25 years machinery has changed tremendously for the better. The customer gets much more in a machine than he used to. The price of machine shop labor has gone up at least 50 per cent. Weights have increased. In the case of the present machine it is 15 per cent. heavier than its predecessor of 1888. Over-

head is constantly growing higher. The whole design has been altered to conform to the requirements of high speed steels. On the face of it, the price appears to be very much too low today. But against these elements of increased expense must be placed the improved manufacturing methods and equipment, the greater efficiency, the higher degree of organization.

Probably the per cent. of profit was greater 25 years ago than it is today. Certainly it was as great. And that suggests the wide difference between 1888 and the period which ended a few years ago, of which merciless price cutting was the marked characteristic. When the lists are sent another step upward, as is likely to happen in the not far distant future, comparisons like the one above will be of use as indicating that the manufacturers are attempting no extortion.

Handling Light Repairs in the Tool Room

In striving to perfect the economy of shop service, the alert superintendent acts upon the plan of filling up the gaps in each man and machine's output curve, just as the electric lighting company strives to offset the heavy cost of its peak loads by cultivating a large day service to power users. The tool room is particularly susceptible to this sort of analysis. The demands upon it, in most cases, fluctuate widely from hour to hour and produce not a little lost motion on the part of attendants, unless the intervals are occupied with profitable service. Tool making is in many cases performed in another department, and even in a large establishment there is often time left for useful service by the tool room force after the requirements of sharpening and checking are satisfied.

With the frequent interruptions which must be met it is obvious that nothing elaborate in the way of productive work can profitably be undertaken in the tool room, but if the establishment is equipped with the best facilities for light repair work, a good many odd jobs of a maintenance character can be turned out with economy and dispatch. The little points which save time must be looked after, however, such as the installation of a bell or whistle signal at the delivery and receiving windows, the placing of modern lighting units and reflectors throughout the tool section and the provision of a suitable lathe and machine for shaping, drilling and grinding with variable-speed motor or other compact drive in a reserved, well-lighted space adjacent to the delivery section. With the tendency toward specialization in tool sharpening, a high class of attendance is required in tool rooms, and the plan of encouraging light repairs and sometimes even development work on a small scale has advantages from the standpoint of freeing the remainder of the shop from more or less irregular production. Few organizations exist where jobs of small size are not causing obstruction to the output of valuable machines capable of handling heavier tasks, and the tool room offers in many cases a satisfactory solution of the problem.

Correspondence

Origin of the Cotter-Pin

To the Editor: Can you discover for me the origin of that useful little article, the cotter-pin? Information as to its early use, as well as the derivation of the name, would add something to the sum of knowledge, at least to mine. I recently heard it remarked that automobiles consist largely of nuts and cotter-pins. This is as it appears from the point of view of the chauffeur or mechanic.

Waterbury, Conn.

A. C. CAMPBELL.

The American Iron and Steel Institute

A Large Increase in Membership—Plans for October Meeting in Pittsburgh

The directors of the American Iron and Steel Institute elected 180 new members at their regular monthly meeting in New York, June 28. Previous to the annual meeting of the institute held at the Waldorf-Astoria, New York, in May about 100 new members were elected. The present membership is over 600, with prospects of further rapid growth. The directors passed a resolution last week electing as honorary members of the institute the president and all past presidents of the Iron and Steel Institute (London) and the presidents and past presidents of national organizations of iron and steel manufacturers in European countries.

It was decided to hold the semi-annual meeting of the institute at Pittsburgh in the latter part of October. James A. Farrell was made chairman of the general committee for this meeting. Other members are Frank S. Witherbee, E. A. S. Clarke and John A. Topping. A fifth member is yet to be selected. Willis L. King, vice-president of the Jones & Laughlin Steel Company, was made chairman of the Pittsburgh local committee for the meeting and was authorized to select his associates. The programme at Pittsburgh will follow the lines of the one so successfully carried out at the New York meeting, giving the forenoon session to commercial questions, the afternoon session to technical papers and discussions and the evening session to welfare work.

Large Steel Corporation Equipment Orders

The United States Steel Corporation has recently placed a number of orders for power equipment and machinery. One important contract, placed with the Allis-Chalmers Company, includes four gas engine electric generators of 3000-kw capacity for the power station at the Gary works. A similar order has been given for the power station at the Duluth plant of the Minnesota Steel Company. The blowing engines for the latter have not yet been placed, however. Among recent appropriations made by the corporation is one for two low-pressure turbo blowing engines for the Ensley blast furnaces of the Tennessee Coal, Iron & Railroad Company. The renewal of appropriations for such work by the Steel Corporation is one of the indications of the broadening of iron and steel operations and of the participation of foundry and machinery interests in new business to a greater extent than in many months.

Sheet and Tin Plate Scale Settled

At a conference held in Pittsburgh last week between representatives of the Amalgamated Association and of the sheet and tin plate companies in the Central West that sign the Amalgamated scale, a wage settlement was reached for the year beginning July 1. The basis is the same as in the scale which expired June 30, the only changes being in foot notes. The companies represented are as follows:

American Rolling Mill Company, Middletown, Ohio.
Follansbee Brothers Company, Follansbee, W. Va.
Newport Rolling Mill Company, Newport, Ky.
Whitaker-Glessner Company, mills at Wheeling, W. Va., and Martins Ferry, Ohio.
Phillips Sheet & Tin Plate Company, for its tin plate mill at Steubenville, Ohio, its two other tin plate mills at Weirton and Clarksburg, W. Va., being operated non-union.
Carnahan Sheet & Tin Plate Company, Canton, Ohio.
Brier Hill Steel Company, Youngstown, Ohio, for its Thomas and Empire sheet mills at Niles, Ohio.
Deforest Sheet & Tin Plate Company, Niles, Ohio.
N. & G. Taylor Company, Cumberland, Md.
National Enameling & Stamping Company for its mills at St. Louis, Mo., and Granite City, Ill.
Youngstown Iron & Steel Company, Youngstown, Ohio.

All of the Lackawanna Steel Company's blast furnaces at Buffalo, N. Y., are now running, No. 7 furnace having been blown in the latter part of June, and the company's plant is very busy in every other department.

Burrows, Sloan & Co., Philadelphia, Pa., have been appointed Eastern sales agents for the Knox Pressed & Welded Steel Company, Pittsburgh, and will handle all the open-hearth specialties made by the Knox Company as well as welded work and general steel plate construction.

The Imataca Iron Mines

Progress of the Work Canadian Interests Are Carrying on in Venezuela

Consul Thomas W. Voetter, La Guaira, Venezuela, writes to the Daily Consular and Trade Reports concerning the Imataca iron mines on the Orinoco River, which are now being operated by the Canadian-Venezuelan Ore Company (Mackenzie-Pearson interests) of Montreal, Canada. A new port has been established near these mines, which are located near where the Imataca Mountains approach the south canyon or pass of the Orinoco delta. Further inland along the Orinoco are other iron deposits, said to be large, which have been denounced by interests reported to represent Eastern Pennsylvania blast furnace companies, but the names are not disclosed. These last named deposits are reported to be near the river bank, so that transportation would not be difficult. The ore is chiefly hematite; there is also some limonite.

United States Consular Agent W. D. Henderson, who is connected with a bank at Ciudad Bolivar, which is more than 100 miles up the Orinoco from the Imataca mines, sends to the Department of Commerce and Labor an account of the Imataca Ore Company's operations, which appeared in the Port of Spain (Trinidad) Mirror:

"The Imataca Ore Company commenced prospecting some 18 months ago, and actual operations, with a view to exploration, began last November. Since then the Alabama, of 1100 tons, has made three trips from Philadelphia with machinery and supplies, returning once in ballast and twice with a full cargo of ore. The equipment brought down for handling and loading the ore is of modern design, being entirely operated by electricity generated in a 1000-hp. station equipped with Babcock & Wilcox boilers. Two endless rope haulage tramways, one from the east and one from the west, will transport the ore from the different tunnels and open cuts to a central hill, where the cars will run out to a tippie trestle and be dumped into large pockets excavated in the hill on either side of the trestle, and each capable of holding 10,000 tons of ore. Beneath each of these pockets are tunnels of reinforced concrete with chute openings, whereby the ore may be run out to an endless belt conveyor. This belt conveyor will carry the ore to a pier and elevate it to a trestle whence a chute will pour a steady stream of ore into the waiting steamer. The rope tramways and conveyors are operated by 100-hp. electric motors.

"For construction and repairing purposes the company has a machine shop, with modern machine tools, a wood-working shop, and a sawmill. A large warehouse and store and a refrigerating plant are also a part of the equipment. All dwellings and buildings are constructed of expanded metal and concrete, and are both sanitary and cool.

"At the present time the east tramway, power house and pockets are well under way, and a few months more will see them in full operation. The company is giving employment to some 400 laborers, mechanics and miners, recruiting from all parts of Venezuela, British Guiana, and the West Indies. This labor has proved very satisfactory, and the supply seems ample, for as the mines are better known the daily ingress of men is increasing. So far the only actual mining has been temporary open-cut work, sufficient to load the supply steamer with a return cargo."

It is said to be the intention to use steamers of large capacity in carrying Imataca ore to the United States. The difficulty, however, is that not more than a 14-ft. draft is possible as far up the Orinoco as the mine location, and there is also the shallowness of water at the Orinoco Bar.

The Inland Steel Company, Chicago, is about to add to the equipment of its rivet department machinery suitable for making cold pressed rivets in sizes from $\frac{3}{4}$ to $\frac{1}{2}$ in. diameter and with capacity for 50 tons daily. The company will receive tenders for this machinery.

The Bridgeport Chain Company, Bridgeport, Conn., states that the rumor in circulation that it has been absorbed by another corporation, in a similar line of business, is without any foundation whatever. The control of the Bridgeport Chain Company has not passed into other hands, but is still under the same careful management that it has been for many years, and its facilities for economical production are greater to-day than ever.

Pig Iron Production

June Rate Shows but Slight Increase

Output for the First Half of the Year Approximately 14,050,000 Gross Tons

Our blast furnace returns for June, which through the prompt co-operation of the furnace companies, were in our hands on July 2, do not bear out the expectation of a considerable increase in the rate of production last month. The total of coke and anthracite iron for the 30 days of June was 2,440,745 tons, or 81,358 tons a day, against 2,512,582 tons in May, or 81,051 tons a day. The steel company furnaces were not all as effective as in May and a few of them have had to be blown out for relining. The daily rate of production for steel works furnaces last month was 60,799 tons, against 62,018 tons in May, a falling off of 1219 tons. Merchant furnaces, however, made a gain of over 1500 tons a day, their rate of production being 20,559 tons, against 19,033 tons, so that the net increase in daily output over May was 300 tons. On July 1 the number of coke and anthracite furnaces in blast was 248, with 81,711 tons daily capacity, which compares with 247 furnaces and 81,435 tons daily capacity on June 1—a net gain of 1 furnace and a net gain in capacity of 276 tons a day.

The production of pig iron in the first half of 1912 was probably somewhat above 14,050,000 gross tons, including charcoal iron. This compares with 11,666,996 tons in the first half of 1911 and 11,982,348 tons in the second half.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from June, 1911, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons.			
	Steel works.	Merchant.	Total.
June, 1911	42,708	16,877	59,585
July	42,472	15,369	57,841
August	47,120	15,030	62,150
September	49,696	16,207	65,903
October	50,351	17,460	67,811
November	48,430	18,218	66,648
December	46,885	19,027	65,912
January, 1912	47,844	18,540	66,384
February	53,482	18,960	72,442
March	58,961	18,630	77,591
April	61,024	18,157	79,181
May	62,018	19,033	81,051
June	60,799	20,559	81,358

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in June and the four months preceding:

Monthly Pig Iron Production—Gross Tons.					
	Feb. (29 days)	Mar. (31 days)	Apr. (30 days)	May (31 days)	June (30 days)
New York	119,420	148,176	152,419	177,846	176,216
New Jersey	.....	.....	.....	.....	2,773
Lehigh Valley	70,185	79,866	79,955	75,444	72,074
Schuylkill Valley	64,817	63,787	61,323	65,252	67,096
Lower Susquehanna and Lebanon Val.	41,169	41,780	46,102	47,336	50,034
Pittsburgh district	525,445	623,450	599,774	634,160	591,178
Shenango Valley	118,163	121,923	117,099	119,018	118,801
West, Penn.	109,552	123,234	129,223	141,385	138,354
Maryland, Virginia and Kentucky	38,393	39,215	33,744	38,005	42,569
Wheeling district	117,599	124,108	110,295	117,993	107,077
Mahoning Valley	224,200	254,876	248,173	247,401	229,159
Central and North Ohio	159,562	192,707	184,699	193,012	191,603
Hocking Valley, Hanging Rock and S. W. Ohio	34,627	37,875	39,446	40,267	34,817
Chicago district	250,333	306,017	332,004	377,292	387,567
Mish., Minn., Mo., Wis., Col., Wash.	65,192	70,300	68,846	67,825	63,649
Alabama	137,720	149,931	151,610	150,915	141,422
Tenn., Georgia and Texas	24,438	28,073	20,723	19,431	26,356
Total	2,100,815	2,405,318	2,375,436	2,512,582	2,440,745

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons.			
	Pig. Total production		
	1910.	1911.	1912.
January	1,773,201	1,128,448	1,483,153
February	1,620,539	1,185,782	1,550,995
March	1,739,212	1,518,063	1,827,792
April	1,669,898	1,434,142	1,830,717
May	1,619,283	1,310,378	1,922,557
June	1,549,112	1,281,241	1,823,958
July	1,462,689	1,316,646	22,924
August	1,442,572	1,460,610	25,756
September	1,410,221	1,490,898	15,151
October	1,419,624	1,560,884	8,500
November	1,242,804	1,452,907	9,032
December	1,113,174	1,453,446	12,178

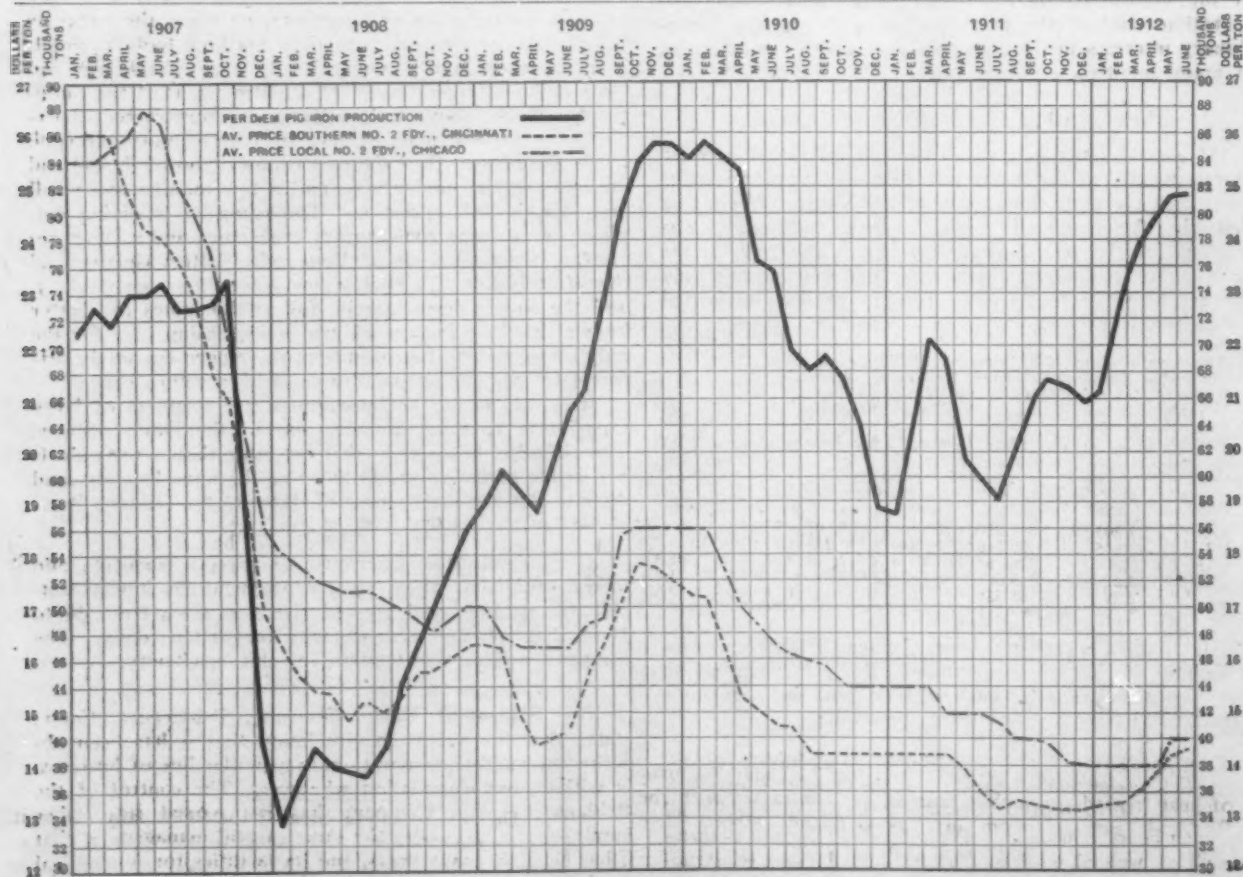


Diagram of Daily Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to July 1, 1912; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Capacity in Blast July 1 and June 1

The following table shows the daily capacity of furnaces in blast July 1 and June 1:

Coke and Anthracite Furnaces in Blast.					
Location of Furnaces.	Total number of stacks.	July 1 Number in blast.	July 1 Capacity per day.	June 1 Number in blast.	June 1 Capacity per day.
<i>New York:</i>					
Buffalo	17	16	5,640	15	5,240
Other New York	7	2	435	3	571
New Jersey	7	1	125	0	0
<i>Pennsylvania:</i>					
Lehigh Valley	22	9	2,110	10	2,350
Spiegel	2	1	93	1	84
Schuylkill Valley	16	9	2,405	8	2,056
Lower Susquehanna	7	4	990	2	630
Lebanon Valley	10	6	895	6	910
Pittsburgh District	49	45	19,350	45	19,704
Spiegel	4	4	527	4	510
Shenango Valley	20	12	3,960	12	4,050
Western Pennsylvania	27	16	4,612	16	4,641
Maryland	4	2	575	2	565
Wheeling District	14	9	3,540	10	3,806
<i>Ohio:</i>					
Mahoning Valley	24	19	7,640	19	8,003
Central and Northern	24	16	6,270	16	6,274
Hocking Val., Hanging					
Rock & S. W. Ohio	15	8	1,160	9	1,310
Illinois and Indiana	32	28	12,580	29	12,150
Spiegel	2	2	240	1	125
Mich., Wis. and Minn.	10	5	1,246	4	1,005
Colorado, Mo. & Wash.	8	3	1,055	3	1,083
<i>The South:</i>					
Virginia	23	5	596	5	573
Kentucky	5	1	130	1	130
Alabama	46	17	4,657	18	4,910
Tennessee	20	8	880	8	755
Total	415	248	81,711	247	81,435

Among furnaces blown in in June were one Lackawanna at Buffalo, Oxford in New Jersey, one Worth in Schuylkill Valley, one Paxton and one Steelton in the Susquehanna Valley, Tod in the Mahoning Valley, one River (new) in Northern Ohio, and Zenith in Minnesota. The list of furnaces blown out last month included Port Henry in New York, one Bethlehem in the Lehigh Valley, one Bellaire in the Wheeling district, one Ohio in the Mahoning Valley, one Toledo in Northern Ohio and one Gadsden in Alabama.

Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The figures for daily average production are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.	1912.
January	71,149	33,918	57,975	84,148	56,752	66,384
February	73,038	37,163	60,976	85,616	64,090	72,442
March	71,821	39,619	59,232	84,459	70,036	77,591
April	73,885	38,289	57,962	82,792	68,836	79,181
May	74,048	37,603	60,753	77,102	61,079	81,051
June	74,486	36,444	64,656	75,516	59,585	81,358
July	72,763	39,287	67,793	69,305	57,841	.....
August	72,594	43,851	72,546	67,963	62,150	.....
September	72,783	47,300	79,507	68,476	65,903	.....
October	75,386	50,554	83,856	67,520	67,811	.....
November	60,937	51,595	84,917	63,659	66,648	.....
December	39,815	56,158	85,022	57,349	65,912	.....

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.	1912.
Jan.	2,205,607	1,045,250	1,797,560	2,608,605	1,759,326	2,057,911
Feb.	2,045,068	1,077,740	1,707,340	2,397,254	1,794,509	2,100,815
Mar.	2,226,457	1,228,204	1,832,194	2,617,949	2,171,111	2,405,318
Apr.	2,216,558	1,149,602	1,738,877	2,483,763	2,064,086	2,375,436
May	2,295,505	1,165,688	1,883,330	2,390,180	1,893,436	2,512,582
June	2,234,575	1,092,131	1,930,866	2,265,478	1,787,566	2,440,745
July	2,255,660	1,218,129	2,103,431	2,148,442	1,793,068	.....
Aug.	2,250,410	1,359,831	2,248,930	2,106,847	1,926,637	.....
Sept.	2,183,487	1,418,998	2,385,206	2,056,275	1,977,102	.....
Oct.	2,336,972	1,567,198	2,599,541	2,093,121	2,102,147	.....
Nov.	1,828,125	1,577,854	2,547,508	1,909,780	1,999,433	.....
Dec.	1,234,279	1,740,912	2,635,680	1,777,817	2,043,270	.....

The Parish Mfg. Company, Reading, Pa., manufacturer of heat treated automobile frames, has contracted with the Rockwell Furnace Company, 26 Cortlandt street, New York, for another of its overfired car type accurate temperature heat treating furnaces. This is the fourth Rockwell furnace which that company has installed.

Remarkable Durability of a Ball Bearing

A remarkable exhibition of the service of ball bearings was recently shown by an investigation conducted by George M. Bond, Hartford, Conn. Two ball bearings made by the Hess-Bright Mfg. Company, Philadelphia, were installed in one of the journal boxes of an electric traction car of the Atlantic City & Shore Railroad. After 3½ years' service, in which time the car ran some 150,000 miles, the journal box and its two bearings were removed for measurement. Mr. Bond found that the mean or average radial freedom was 0.000046 in., or practically nil, and the mean end play 0.00125 in. The mean or average eccentricity of the inner race was found to be only 0.00004 in., also practically nil. The mean radial freedom for the second ball bearing was found to be 0.0003 in., the mean or average end play 0.0007 in., and the mean or average eccentricity of the inner race 0.00025 in.

The larger wear shown in the second bearing, small though it is, is accounted for in the fact that this particular bearing had to take the end thrust of the axle. It appears that in the 3½ years that the bearings have been in service no attention was required, other than being greased once in a ten or twelve months' period. It is understood also that due to the fact that the axles did not have the customary end play, there has been a distinct reduction of flange wear, with the result that there is little or no shock on entering a curve and diminished side sway.

Blast Furnace Notes

The Bethlehem Steel Company had five of its six furnaces at South Bethlehem, Pa., in blast July 1, one furnace having been blown out in June.

The receivers of the Central Iron & Steel Company, Harrisburg, Pa., blew in one of the company's Paxton furnaces June 25.

The Maryland Steel Company put in blast its D furnace on June 5 and its C furnace was banked on June 15, two of the four furnaces being in blast July 1.

One Bellaire furnace of the Carnegie Steel Company, Bellaire, Ohio, was blown out in June for relining and repairs. The other was in blast July 1.

The B furnace of the Toledo Furnace Company, Toledo, Ohio, was blown out June 29.

The Alabama Consolidated Coal & Iron Company had all its four furnaces out of blast on July 1, the one active furnace at Gadsden, Ala., having been blown out June 22.

Tod furnace, of the Brier Hill Steel Company, Youngstown, Ohio, was blown in on June 1, having been idle about to months.

The Columbus Iron & Steel Company's No. 1 furnace at Columbus, Ohio, which blew out June 26, is expected to resume in the coming week.

The Worth Brothers Company, Coatesville, Pa., blew in its No. 1 furnace early last week, which was out a short time for relining. It is now producing about its normal make of basic iron.

The Carnegie Steel Company is operating 46 out of its 57 blast furnaces. One Duquesne, one Edgar Thomson, one South Sharon, one Bellaire, and one Ohio stack are idle for repairs. The Edith, Steubenville, Neville Island, Steelton and Zanesville furnaces of this company are isolated stacks and have not been operated for several years, their chances for going in blast still being remote.

The Great Lakes Engineering Works, Detroit, Mich., has taken an order from an Eastern firm of coal shippers for a fleet of self-propelling steel barges to be operated on the Warrior River, Alabama, for delivering coal to New Orleans. The barges will be 30 ft. wide and 240 ft. long. It is stated that the contract is for about 30 barges, but only about 15 of them will be built at present.

A large contract for industrial cars has been placed with the Atlas Car & Mfg. Company, Cleveland, Ohio, by the Corn Products Refining Company, Chicago. This order is for 900 cars, specially designed for use in hauling and drying starch.

The Detroit Seamless Steel Tubes Company, Detroit, Mich., suffered the loss of its plant by fire July 1. Press dispatches place the loss at nearly \$300,000, with insurance of \$200,000.

The Iron and Metal Markets

Confidence More General

Both as to Sustained Volume and Prices

The Steel Corporation a Buyer of Pig Iron— Record Steel Exports—An Advance in Wrought Pipe

The advances in prices of three leading forms of finished steel announced by a number of manufacturers one week ago seem to have been taken as an added factor of encouragement by consumers as well as producers. The access of confident sentiment in the past week has been, in fact, the most noteworthy feature of the market.

Reports agree that the business done at the new prices is not large, but where they were not put into effect until July 1 a good many buyers were quite willing to pay the price last in force—1.20c. Pittsburgh in the case of bars—so that the average price of tonnage on the books has been raised by the week's operations. It is noticeable, also, that smaller producers are asking the new prices and that the concessions from the Pittsburgh basis which have been noticed in the East on plates and structural steel have practically disappeared.

Among factors entering into the prevailing view of the future is last week's court decision upholding the validity of the New York subway contracts. Fully 400,000 tons of steel will be required for this work in the next few years.

The expected increase in pig iron output in June, our statistics show, was not realized. The coke and anthracite furnaces produced 2,440,745 tons, or 81,358 tons a day, against 2,512,582 tons in May, or 81,051 tons a day. Some of the steel company furnaces blew out for relining and others did not come up to their May efficiency. The daily average of such furnaces last month was 60,799 tons, or about 1200 tons less than in May. The merchant furnaces, however, made 1500 tons a day more than in May, so that there was a net increase of 300 tons a day over May.

On July 1 the 248 furnaces in blast were producing at the rate of 81,711 tons a day—a gain of 1 furnace and of 276 tons a day over the capacity active June 1.

We estimate the country's pig iron production for the first half of the year, including charcoal iron, at 14,050,000 tons, against 11,666,996 tons in the first half of 1911 and 11,982,348 tons in the second half.

Reports show that stocks of pig iron in Alabama, Eastern Pennsylvania and in Ohio and Western Pennsylvania, for all of which districts statistics are regularly compiled, were reduced in June. The United States Steel Corporation has bought several lots of Bessemer iron in the Central West and may be in the market for more, two of its furnaces in that section having gone out last month. Two of its Chicago furnaces also are about to be relined.

Pig iron markets are generally firmer, but there are irregularities, and concessions are heard of in a number of quarters. The Southern market has been working to a stronger position, and Birmingham producers

more generally have \$11.50 for their minimum on No. 2, while \$12 is now asked by two large companies. Steel making pig iron is stronger at Pittsburgh and in the Valleys, though buying is light, apart from that of the Steel Corporation. In Eastern Pennsylvania basic iron has sold at \$15.50 delivered.

The demands on rolling mills are such that shut-downs this week for repairs and for the holiday will be of minimum length. Consumers are making special pleas in a good many cases to get needed deliveries.

In the rail market the feature is the extent of buying by smaller roads. In the past week the Alabama mill booked 28,000 tons in small orders, while Chicago mills took 40,000 tons, of which the largest lot was 5000 tons for the Kansas City Railway. Brazil is in the market for several lots, including 10,000 tons for the Central Railway of Brazil. Canadian roads are not through buying here.

Car buying has been resumed. The Grand Trunk Pacific has placed 2000 cars, mostly in the Chicago district. The Reading has bought 1000 cars. The Denver & Rio Grande is in the market for 1500 and the Virginia Railroad for 750. Locomotive work is growing. Japan has divided an order for 42 locomotives between the two large American builders.

Wire products, which have not been in line with the general movement owing to the backward season, have been picking up lately, but the \$1.60 basis for wire nails is still cut in competitive districts.

The wrought steel pipe manufacturers advanced prices one point, or \$2 a ton, July 1 on 7-inch pipe and larger. A similar advance in the smaller sizes was made June 1.

The Steel Corporation's unfilled order statement for June 30, to be published next week, is expected to show some falling off.

Exports of iron and steel made a new record in May at 307,654 tons, or 40,000 tons more than in April and 130,000 tons more than for May, 1911.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	July 3, 1912.	June 26, 1912.	June 5, 1912.	July 5, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.25	\$15.00
Foundry No. 2, Valley furnace	13.25	13.25	13.25	13.50
Foundry No. 2, Southern, Cincinnati	14.50	14.25	14.25	13.25
Foundry No. 2, Birmingham, Ala.	11.25	11.00	11.00	10.00
Foundry No. 2, at furnace, Chicago*	14.50	14.50	14.50	15.00
Basic, delivered, eastern Pa.	15.50	15.25	15.25	14.50
Basic, Valley furnace	13.25	13.25	13.00	13.25
Bessemer, Pittsburgh	15.15	15.15	15.15	15.90
Malleable Bessemer, Chicago	14.50	14.50	14.50	15.00
Gray forge, Pittsburgh	13.90	13.90	13.90	13.90
Lake Superior charcoal, Chicago	16.25	16.25	16.25	16.50
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	21.50	21.50	21.00	21.00
Open hearth billets, Pittsburgh	21.50	21.50	20.50	21.00
Forging billets, Pittsburgh	28.00	28.00	28.00	26.00
Open hearth billets, Philadelphia	24.40	23.40	23.40	23.40
Wire rods, Pittsburgh	25.00	25.00	25.00	27.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	16.00	16.00	16.00	14.00
Iron rails, Philadelphia	16.50	16.50	16.50	16.50
Car wheels, Chicago	14.00	14.00	14.25	12.50
Car wheels, Philadelphia	14.00	14.00	13.50	13.00
Heavy steel scrap, Pittsburgh	13.50	13.50	13.25	13.00
Heavy steel scrap, Chicago	11.75	11.75	12.00	10.25
Heavy steel scrap, Philadelphia	13.50	13.50	13.50	13.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel.

	July 3, 1912.	June 26, 1912.	June 5, 1912.	July 5, 1911.
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.32½	1.30	1.30	1.27½
Iron bars, Pittsburgh.....	1.35	1.35	1.25	1.25
Iron bars, Chicago.....	1.27½	1.27½	1.25	1.20
Steel bars, Pittsburgh.....	1.25	1.20	1.20	1.25
Steel bars, tidewater, New York.....	1.41	1.36	1.36	1.41
Tank plates, Pittsburgh.....	1.30	1.25	1.25	1.35
Tank plates, tidewater, New York.....	1.46	1.41	1.41	1.51
Beams, Pittsburgh.....	1.30	1.25	1.25	1.35
Beams, tidewater, New York.....	1.46	1.41	1.41	1.51
Angles, Pittsburgh.....	1.30	1.25	1.25	1.35
Angles, tidewater, New York.....	1.46	1.41	1.41	1.51
Skelp, grooved steel, Pittsburgh.....	1.20	1.20	1.15	1.25
Skelp, sheared steel, Pittsburgh.....	1.25	1.25	1.20	1.35

Sheets, Nails and Wire.

	Cents.	Cents.	Cents.	Cents.
Per Pound to Largest Buyers:				
Sheets, black, No. 28, Pittsburgh.....	1.90	1.90	1.90	2.00
Wire nails, Pittsburgh.....	1.60	1.60	1.60	1.70
Cut nails, Pittsburgh.....	1.55	1.55	1.55	1.60
Fence wire, ann'led, 0 to 9, Pgh.....	1.40	1.40	1.40	1.50
Barb wire, galv., Pittsburgh.....	1.90	1.90	1.90	2.00

Coke, Connellsville.

	Per Net Ton at Oven:			
Furnace coke, prompt shipment.....	\$2.15	\$2.10	\$2.10	\$1.45
Furnace coke, future delivery.....	2.25	2.25	2.35	1.60
Foundry coke, prompt shipment.....	2.40	2.40	2.40	1.85
Foundry coke, future delivery.....	2.60	2.60	2.50	2.10

Metals, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	17.75	17.75	17.25	12.87½
Electrolytic copper, New York.....	17.62½	17.62½	17.12½	12.62½
Spelter, St. Louis.....	7.00	6.95	6.75	5.60
Spelter, New York.....	7.15	7.10	6.90	5.80
Lead, St. Louis.....	4.40	4.37½	4.12½	4.35
Lead, New York.....	4.50	4.50	4.20	4.50
Tin, New York.....	46.00	48.15	45.75	45.40
Antimony, Hallett, New York.....	7.75	7.75	7.85	8.12½
Tin plate, 100-lb. box, New York.....	\$3.64	\$3.64	\$3.64	\$3.94

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.30c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Places up to 72 in. wide, inclusive, ordered 10.2 lb. per square ft. are considered ¼ in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square ft. to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot, down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.

Cents per lb.

Gauges under ¼ in. to and including 3-16 in. on thinnest edge.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$25. Fence wire, Nos. 0 to 9, per 100 lb., terms, 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.40; galvanized, \$1.70. Galvanized barb wire, to jobbers, \$1.90; painted, \$1.60. Wire nails, to jobbers, \$1.60.

The following table gives the price to retail mer-

chants on wire in less than carloads, including the extras Nos. 10 to 16, which are added to the base price:

	Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10	
Galvanized ...	1.85	1.90	1.95	2.00	2.10	2.20	2.60	2.70	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in., on one or both legs, ¼ in. and over, 1.30c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.....	1.35 to 1.40
H-beams over 18 in.....	1.35 to 1.40
Angles over 6 in.....	1.35 to 1.40
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909.....	1.35 to 1.40
Tees, 3 in. and up.....	1.35 to 1.40
Zees, 3 in. and up.....	1.30 to 1.35
Angles, channels and tees, under 3 in. plus full extras as per steel bar card Sept. 1, 1909.....	1.35 to 1.40
Deck beams and bulb angles.....	1.60 to 1.65
Hand rail tees.....	2.10 to 2.25
Checkered, trough and corrugated floor plates.....	2.25 to 2.50

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 2 ft., inclusive.....	.75
Under 2 ft., to 1 ft., inclusive.....	.50
Under 1 ft.....	1.55
No charge for cutting to lengths 3 ft. and over.	

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8.....	1.25 to 1.30
Nos. 9 and 10.....	1.35 to 1.40
Nos. 11 and 12.....	1.40 to 1.45
Nos. 13 and 14.....	1.45 to 1.50
Nos. 15 and 16.....	1.55 to 1.60

Box Annealed Sheets, Cold Rolled.

Nos. 10 to 12.....	1.55 to 1.60
Nos. 13 and 14.....	1.60 to 1.65
Nos. 15 and 16.....	1.65 to 1.70
Nos. 17 to 21.....	1.70 to 1.75
Nos. 22, 23, and 24.....	1.75 to 1.80
Nos. 25 and 26.....	1.80 to 1.85
No. 27.....	1.85 to 1.90
No. 28.....	1.90 to 1.95
No. 29.....	1.95 to 2.00
No. 30.....	2.05 to 2.10
	2.15 to 2.20

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11.....	1.90 to 2.00
Nos. 12, 13 and 14.....	2.00 to 2.10
Nos. 15 and 16.....	2.10 to 2.15
Nos. 17 to 21.....	2.30 to 2.40
Nos. 22, 23 and 24.....	2.40 to 2.50
Nos. 25 and 26.....	2.60 to 2.70
No. 27.....	2.75 to 2.85
No. 28.....	2.90 to 3.00
No. 29.....	3.00 to 3.10
No. 30.....	3.20 to 3.30

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following:

Corrugated Roofing Sheets by Weight.

Effective April 18, 1912, the rates for painted and formed roofing sheets, per 100 lb., as announced by most of the leading sheet manufacturers, are based on the following extras for painting and forming over prices for corresponding gauges in black and galvanized sheets:

	Gauges, cents per 100 lb.
Painting.....	29 25 to 28 19 to 24 12 to 18
Regular or oiling.....	.15 .10 .05
Graphite, regular.....	.25 .15 .10
Forming.....	
2, 2½, 3 and 5 in. corrugated.....	.05 .05 .05 .05
2 V-crimped, without sticks.....	.05 .05 .05 .05
¼ to 1½ in. corrugated.....	.10 .10 .10 .10
3 V-crimped, without sticks.....	.10 .10 .10 .10
Pressed standard seam, with cleats.....	.15 .15 .15 .15
Plain roll roofing, with or without cleats.....	.15 .15 .15 .15
Plain brick siding.....	.20 .20 .20 .20
3-15 in. crimped.....	.20 .20 .20 .20
Weatherboard siding.....	.25 .25 .25 .25
Beaded ceiling.....	.25 .25 .25 .25
Rock face brick and stone siding.....	.25 .25 .25 .25
Roll and cap roofing, with caps and cleats.....	.25 .25 .25 .25
Roofing valley, 12 in. and wider.....	.25 .25 .25 .25
Ridge roll and flashing (plain or corrugated).....	.65 .65 .65 .65

Corrugated Roofing Sheets, with 2½-in. Corrugations, per Square.

Some leading manufacturers of roofing material are

still quoting on an area basis and are naming prices as follows:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29.....		\$2.40	23.....	\$2.30	\$3.50
28.....	\$1.35	2.55	22.....	2.50	3.80
27.....	1.50	2.60	21.....	2.70	4.05
26.....	1.60	2.65	20.....	2.90	4.35
25.....	1.80	3.05	18.....	2.90	5.70
24.....	2.00	3.15	16.....	4.70	6.50

Wrought Pipe.—The following are the jobbers' car-load discounts (card weight) on the Pittsburgh basing card on steel pipe, in effect from June 1, 1912, on 6 in. and smaller and from July 1, 1912, on sizes above 6 in.; black iron pipe from December 1, 1911; galvanized iron pipe from March 1, 1913, one point greater being allowed on merchant weight:

Butt Weld.

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
1/2 and 3/4 in.....	73	53	68	49
3/4 in.....	74	64	69	53
1 in.....	77	67	72	59
1 1/4 to 1 1/2 in.....	80	72	75	64
2 to 3 in.....	81	74	76	65

Lap Weld.

1 1/4 and 1 1/2 in.....	78	71	72	61
2 in.....	78	71	72	63
2 1/2 to 4 in.....	80	73	74	66
4 1/2 to 6 in.....	79	71	73	65
7 to 12 in.....	77	67	71	61
13 to 15 in.....	54	..	47	..

Plugged and Reamed.

1 to 1 1/2 in., butt weld.....	78	70	73	62
2 to 3 in., butt weld.....	79	72	74	63
2 in., lap weld.....	76	69	70	61
2 1/2 to 4 in., lap weld.....	78	71	72	64

Butt Weld, extra strong, plain ends, card weight.

1/2, 3/4, 1 in.....	69	59	65	55
1 1/4 in.....	74	68	70	63
1 1/2 to 1 3/4 in.....	78	72	74	65
2 to 3 in.....	79	73	75	66

Lap Weld, extra strong, plain ends, card weight.

1 1/2 in.....	..	..	66	60
2 in.....	75	69	71	63
2 1/2 to 4 in.....	77	71	73	66
4 1/2 to 6 in.....	76	70	72	65
7 to 8 in.....	69	59	65	55
9 to 12 in.....	64	54	60	50

Butt Weld, double extra strong, plain ends, card weight.

1/2 in.....	64	58	60	52
3/4 to 1 1/2 in.....	67	61	63	55
2 to 2 1/2 in.....	69	63	65	57

Lap Weld, double extra strong, plain ends, card weight.

2 in.....	65	59	61	52
2 1/2 to 4 in.....	67	61	63	57
4 1/2 to 6 in.....	66	60	62	56
7 to 8 in.....	59	49	55	45

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		Standard Charcoal Iron.	
1 1/4 to 2 1/4 in.....	64	1 1/2 in.....	48
2 1/2 in.....	66 1/2	1 3/4 to 2 1/4 in.....	50
2 3/4 to 3 1/4 in.....	71 1/2	2 1/2 in.....	55
3 1/2 to 4 in.....	74	2 3/4 to 3 1/4 in.....	57 1/2
5 to 6 in.....	66 1/2	3 1/2 to 5 in.....	60
7 to 13 in.....	64	Locomotive and steamship special grades bring higher prices.	

2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.

2 1/2 in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Pittsburgh

PITTSBURGH, PA., July 3, 1912.

Specifications against contracts for finished products were rushed into the mills last week at an enormous rate to avoid the canceling of any unspecified tonnage. A few contracts that expired June 30 have been carried over, pending the adjustment of certain conditions that have come up. The present is a seller's market in the strictest sense of the term. While specifications in July may show a falling off, the explanation is that buyers are now well covered. There is every evidence that the situation for the last half of the year is practically assured. The larger steel mills have commitments that will take practically their entire output for the third quarter, and have sold heavily into the fourth quarter. It will tax their utmost resources for the next three months or more to come anywhere near satisfying customers on deliveries. The advance of \$1 a ton in bars,

plates and shapes made last week was well received by the trade and is accepted as being fully justified. The spike makers have advanced prices 5c. per 100 lb., and an early advance in rivets and bolts is looked for. The wire trade is the one department that has not responded to the general improvement in the steel business, the \$1.60 price being shaded 5c. per keg in the Southwest to meet competition of some mills favorably located as to freight rates. The pig iron market has also been a disappointment, and prices are low when present costs are considered, particularly the cost of coke. The steel billet market continues very tight and prompt steel is bringing premiums. Scrap is strong and some dealers are indifferent about selling, believing that higher prices will soon prevail. Coke is very firm, with the prospects for \$2.50 for furnace coke for the last half of the year better than at any time since the deadlock between the furnacemen and the coke operators started.

Pig Iron.—The determined stand taken by some of the coke interests to obtain \$2.50 for furnace coke for shipment over last half of the year seems to have given the pig iron market a little more strength, but while prices are firmer they are not as yet actually higher. The only large active inquiry in the market is that of the Pittsburgh Steel Company for about 25,000 tons of basic iron for third quarter, and it is intimated that the order will be placed with a furnace east of Pittsburgh, instead of going to Valley furnaces as has been the case heretofore. While no official order has been given, it is probable that the fourth Aliquippa furnace of the Jones & Laughlin Steel Company will be started not later than August 1. The Andrews & Hitchcock Iron Company is expected to blow in a furnace in the near future and the Kittanning furnace, which has been idle for some months, may possibly go in this month. W. P. Snyder & Co. report that the average price of Bessemer iron in June was \$14.25, compared with \$14.23 in May, and of basic \$13.29, compared with \$13 in May. The Bessemer price does not include some small sales made at slightly under \$14.25. Sales are reported of 200 tons of Bessemer iron for July shipment at \$14.25, of 200 tons of Bessemer iron for July shipment at \$14.25, 1200 tons of basic for July and August at \$13.25 and 500 tons of gray forge for July delivery at \$13, all at Valley furnace. We quote: Bessemer iron, \$14.25; basic, \$13.25 to \$13.50; Northern No. 2 foundry, prompt delivery, \$13.25 and for last half, \$13.50; malleable Bessemer, \$13 to \$13.25, and gray forge, \$13, all at Valley furnace, the freight rate to Pittsburgh district being 90c. a ton.

Steel Billets and Sheet Bars.—Prices on long time contracts for billets and sheet and tin bars for third quarter will be slightly higher than those ruling in second quarter. Reports are going of sales of billets and sheet bars for prompt delivery at about \$1 a ton or more above what is regarded as the regular market. A sale of 600 tons of open-hearth sheet bars for July delivery is reported on the basis of about \$22.35 at maker's mill. We quote for delivery in third quarter as follows: Bessemer and open-hearth billets, \$21.50 to \$22; Bessemer and open-hearth sheet bars, \$22 to \$22.50; axle billets, \$25 to \$26; forging billets, to be used for general forging purposes, \$28, all f.o.b. cars, Pittsburgh or Youngstown mill.

Ferroalloys.—There is some inquiry for ferromanganese for delivery over the first half of next year, consumers being pretty well covered for the remainder of 1912. A sale is reported of 600 tons of 80 per cent. English ferromanganese, deliveries 100 tons a month, over the last half of this year, at \$48.50, Baltimore, for a steel casting plant located outside of Pittsburgh. Sales of three or four carloads, or about 100 tons, of ferrosilicon for prompt delivery are reported at the full price of \$72.50, delivered. The market on ferroalloys of all kinds is very strong. We quote 80 per cent. English ferromanganese at \$48.50, Baltimore, for delivery over the last half of this year and into the first half of 1913, while small lots for prompt shipment are bringing \$50 to \$52, f.o.b. Baltimore. We quote 50 per cent. ferrosilicon in lots up to 100 tons at \$72.50; over 100 tons to 600 tons, \$71.50, and over 600 tons, \$70.50, Pittsburgh. The lower grades are ruling at about \$20 for 10 per cent.; \$21 for 11 per cent.; \$22 for 12 per cent., f.o.b. cars at furnace, Ashland, Ky., or Jackson, Ohio. On ferrotitanium we quote 8c. per lb. for carload lots; 10c. per lb. in 2000-lb. lots and over, and 12 1/4c. per lb. in lots up to 2000 lb.

Wire Rods.—Makers report that specifications against contracts have been coming in more freely. Some contracts for Bessemer and open hearth rods are reported to have been closed for last half of the year delivery on the basis of about \$25, Pittsburgh, but it is

intimated that in some cases this price has been shaded about 50c. a ton.

Muck Bar.—There is a fair amount of new inquiry, but very little muck bar is available in the open market. Prices are firmer, due to the signing of the puddling scale of the Sons of Vulcan, under which puddlers get \$6 a ton straight. We quote best grades, made from all pig iron, at \$29.50 to \$30, Pittsburgh.

Skelp.—Local mills report they are filled up on contracts over the next two or three months with new inquiries heavy. Sales of grooved iron skelp are reported to have been made as high as 1.70c., delivered, Pittsburgh. We quote grooved steel skelp at 1.20c.; sheared steel skelp, 1.25c.; grooved iron skelp, 1.65c. to 1.70c., and sheared iron skelp 1.70c. to 1.75c., delivered buyer's mill in the Pittsburgh district.

Steel Rails.—New inquiry for open hearth rails is reported to be quite heavy. The Carnegie Steel Company is still operating its Ohio works at Youngstown on open hearth rails, with work ahead for several weeks. The demand for light rails is active, and in the past week the same company received new orders and specifications against contracts for over 5000 tons. Its Edgar Thomson rail mills have more work ahead of them at present than at any time for several years. We quote splice bars at 1.50c. per lb. and rails as follows: Standard sections, 1.25c. per lb.; 8 and 10-lb., light rails, 1.29½c.; 12 and 14-lb., 1.20c.; 16 and 20-lb., 1.15c.; 25, 30, 35, 40 and 45-lb., 1.10c., in carload lots, f.o.b. Pittsburgh.

Steel Car Wheels.—Both cast iron and steel car wheels for freight and passenger service are in quite active demand, which is expected to be still heavier in the near future as it is known that railroads are figuring on buying a large number of cars during the third quarter. We quote 33-in. by 2½-in. rim rolled steel car wheels for freight service at \$14 to \$14.50 per wheel and 36-in. rim rolled steel wheels for passenger service at \$18.50 to \$19 per wheel, f.o.b. Pittsburgh.

Structural Material.—The market continues very active and a large number of inquiries are out. The Jones & Laughlin Steel Company has taken 500 tons for steel garages to be built in this city for the Atlantic Land Company. The Fort Pitt Bridge Works has taken 615 tons for small bridges for the Pennsylvania Railroad and the Mt. Vernon Bridge Company 450 tons for bridge work for the Pennsylvania Lines West. Local inquiries in the market include 1000 tons for new steel buildings for the Armstrong Coke Company, about 500 tons for a new steel building for the American Vanadium Company and 900 tons for buildings for the Owens-Eastern Bottle Company, Clarksburg, W. Va. The material for the Magee Hospital in this city, about 700 tons, is expected to be placed the next week. The McClintic-Marshall Construction Company has taken 300 tons of structural steel for shipment to Brazil. The new price of 1.30c. on beams and channels is being quoted rigidly by the structural steel interests on all new business that is coming up. However, most of the steel fabricating concerns are covered with material at lower prices for some time ahead. We quote beams and channels up to 15 in. at 1.30c., Pittsburgh.

Plates.—The only car order reported as placed during the week was for 1000 box cars by the Philadelphia & Reading Railroad with the American Car & Foundry Company. The Denver & Rio Grande is reported in the market for about 1200 cars and the Boston & Maine for 2300 hopper cars, 1600 box cars, 100 flat cars, 150 passenger cars, 300 automobile cars, 100 refrigerator cars and 80 passenger cars. The American Shipbuilding Company is said to have taken contracts for two or three freighters in the past week, the plates and shapes for which, upward of 8000 tons, will come to a Pittsburgh mill. The plate mills are congested with tonnage, especially in universal plates, two leading mills not promising deliveries on new orders inside of 12 weeks. The market is firm. We quote ¼ in. and heavier plates at 1.30c., f.o.b. Pittsburgh.

Iron and Steel Bars.—The mills are quoting 1.25c. for steel bars on new inquiries. The output for some months has been the heaviest ever known in the trade and yet all the leading mills are from four to ten weeks back in deliveries. The wage settlement with the Amalgamated Association and with the Sons of Vulcan means that there will be no shut down of the iron and steel bar mills this year, except what may be necessary to make such repairs as are always taken care of in the early part of July. Specifications against contracts for both iron and steel bars are very heavy, especially from the steel car companies. We quote steel bars on new orders at 1.25c. for shipment at convenience of the mill, and iron bars at 1.35c., f.o.b. Pittsburgh.

Tin Plate.—The summer months being always dull, new demand is quiet and confined to small lots. For fear of cancellation, June 30, on any unshipped tonnage on contracts, jobbers rushed in specifications and shipments by the mills in June were very heavy and will probably be nearly as large in July. All the tin plate mills are working to as full capacity as the labor supply and tin bar deliveries by the steel mills will permit. Active work has started on the new tin plate mills of the Pittsburgh Tin Plate Company, Morgantown, W. Va., and the Trumbull Steel Company, Warren, Ohio. Prices are firm. In carloads and large lots \$3.40 to \$3.50 is being quoted on 14 x 20 per base box, while jobbers charge the usual advances for small lots from store.

Sheets.—The new demand in June for black, galvanized and roofing sheets was very heavy and specifications are still freely coming into the mills. Shipments in June were probably the greatest of any one month in the sheet trade and also are likely to be large this month. The Amalgamated Association has reached an agreement with the sheet and tin plate mills, the scale for the year beginning July 1 being practically the same as the one that expired June 30. Prices on sheets are very firm. No. 28 black, box annealed, one-pass sheets are held in carload and larger lots at 1.90c. to 1.95c. and No. 28 galvanized at 2.95c. to 3c. at mill. The usual advances are charged by jobbers for small lots from store.

Cotton Ties.—Nearly all contracts for this season have been placed. It is estimated that the year's business will slightly exceed 1,500,000 bundles. We quote cotton ties at 72c. per bundle f.o.b. Pittsburgh.

Hoops and Bands.—Mills report a fair demand, but most large consumers of both hoops and bands covered their requirements for some time ahead at lower prices than are now ruling. Specifications against these contracts are coming in quite freely. Prices on hoops are out of line, the usual differential between hoops and bands is \$2 to \$3 a ton, but just now they are about on an even basis, due to keen competition. We quote steel bands on new orders at 1.25c. with extras as per the steel bar card, and steel hoops at 1.25c. to 1.30c., f.o.b. Pittsburgh. We are advised that 1.25c. on hoops is absolute minimum, only being named by two or three makers, and on very desirable specifications.

Bolts and Rivets.—The new demand is reported as very heavy, and makers of both bolts and rivets are being flooded with specifications. Indications are that within the next week or two there will be an advance in prices of both rivets and bolts of 5 to 7½ per cent. This will be done on account of the very heavy demand and the higher prices ruling for steel. We quote button head structural rivets at \$1.60 and cone head boiler rivets at \$1.70 per 100 lb. base in carload lots, f.o.b. Pittsburgh. Prices on bolts are very strong, and we quote G. P. coach and lag screws 80 and 20 per cent. off, small carriage bolts, cut threads, 80 and 7½ per cent. off, small carriage bolts, rolled threads, 80 and 15 off; large carriage bolts, 75 and 10 off; small machine bolts, rolled threads, 80 and 20 off; small machine bolts, cut threads, 80 and 12½ off; large machine bolts, 75 and 15 off; square hot-pressed nuts, blank and tapped, \$6.30 off, and hexagon nuts, \$7.10 off. These prices are in lots of 300 lb. or over delivered within a 20c. freight radius of maker's works.

Shafting.—While the demand is showing slight betterment, it is still mostly for small lots. Consumers are specifying against contracts at a fairly satisfactory rate. It is stated that the higher discounts on shafting are being fairly well maintained. We quote cold rolled shafting at 65 per cent. off in carload and larger lots and 60 per cent. in less than carload lots delivered in base territory.

Spelter.—We note a sale of 50 tons for July delivery at 7.02½c., Pittsburgh. The market to-day is higher, and we quote prime grades of Western at 6.95c. to 7c., East St. Louis, equal to 7.07½c. and 7.12½c., Pittsburgh.

Railroad Spikes.—Makers report that the new demand is very heavy, and specifications are coming in quite freely. Nearly all the spike makers are fully sold up for the next two or three months and are from four to six weeks back in shipments. A Southern railroad is in the market for 11,000 kegs. All the makers of standard sizes of railroad spikes are now holding firm at \$1.50 base, an advance of 5c. per keg. We quote railroad spikes 5½ by 9/16 in. at \$1.50, and small railroad and boat spikes at \$1.60 base.

Wire Products.—While this is the off season in the wire trade, makers report that the new demand for wire and wire nails is heavier than usual. A good many

contracts expired June 30, and all unspecified tonnage on these contracts was promptly canceled by the mills. In the Southwest some contracts for wire nails have been placed at \$1.55 base, this being necessary to meet the competition of mills more favorably situated for that trade. We also note that in other sections some fair sized contracts have been placed for delivery over the remainder of the year at \$1.60 base. Although the demand may not show much betterment for the next month or two, a heavy fall trade is expected. We quote wire nails at \$1.60; cut nails, \$1.55; galvanized barb wire, \$1.90; painted, \$1.60; annealed fence wire, \$1.40, and galvanized fence wire, \$1.70, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Merchant Steel.—Mills report that the new demand for seasonable steels is heavy, and specifications are coming in freely. Shipments of two leading makers in June were the heaviest in any one month for several years. Prices are very firm, as follows: Iron finished tire, $1\frac{1}{2}$ by $\frac{3}{4}$ in. and larger, 1.20c. base, under $\frac{3}{4}$ in., 1.35c. base; planished tire, 1.45c.; channel tire, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in., 1.70c.; $1\frac{1}{8}$ in. and larger, 1.60c.; toe calk, 1.75c. base; flat sleigh shoe, 1.25c.; concave or convex, 1.60c.; cutters shoes, tapered or bent, 2.20c.; spring steel, 1.80c.; machinery steel, smooth finish, 1.60c., all f.o.b. cars, Pittsburgh.

Boiler Tubes.—While new business is only fairly heavy, consumers are specifying freely against contracts, and all the makers of tubes are more or less behind in delivery. Prices on both merchant and boiler tubes are very firm.

Coke.—The deadlock between the coke makers and the furnace operators over the \$2.50 price asked for 48-hr. coke for the last half of the year is still on. At the moment the advantage seems to be with the coke operators. The shortage of labor in the coke regions is said to be steadily getting worse, the output has recently decreased materially, and the demand for prompt is heavier. Furnacemen express themselves very strongly in regard to the action of the coke operators in demanding \$2.50, claiming that this price is unwarranted in the present condition of the pig iron market. Prompt furnace coke is scarcer now than it has been for the past month or more. A sale of 100 cars, or about 3500 tons, of standard grade furnace coke and another sale of 50 cars, or about 1500 tons, are reported to have been made at \$2.50 per net ton at oven. The output in the Upper and Lower Connellsville regions last week fell off 18,063 tons as compared with the previous week. We quote strictly Connellsville furnace coke for spot shipment at \$2.15 to \$2.25 and on contracts for last half of the year at \$2.25 to \$2.50 per net ton at oven, most makers now holding for the higher price. Foundry coke is very firm and we quote standard makes for last half delivery at \$2.75 to \$3 per net ton at oven.

Old Material.—The scrap list of the Pennsylvania Railroad contains about 18,000 tons of various grades, more than one-half being heavy steel scrap. The market is very firm and dealers are not trying to force sales, believing that slightly higher prices may rule in the near future. There is a good demand for heavy steel scrap, low phosphorus melting stock and borings and turnings. Sales of 3000 to 4000 tons of heavy steel scrap are reported at \$13.50 to \$13.75 and 1000 tons of low phosphorus melting stock at \$16, all f.o.b. Pittsburgh. Dealers quote as follows, per gross ton:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	\$13.50
No. 1 foundry cast	\$13.00 to 13.25
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	12.00 to 12.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.00 to 14.25
No. 1 railroad malleable stock	12.50 to 12.75
Grate bars	9.75 to 10.00
Low phosphorus melting stock	16.00
Iron car axles	22.50 to 22.75
Steel car axles	15.75 to 16.00
Locomotive axles	22.00 to 22.50
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	14.00 to 14.25
*Cast iron borings	9.75 to 10.00
*Machine shop turnings	10.75 to 11.00
†Sheet bar crop ends	14.75 to 15.00
Old iron rails	15.75 to 16.00
No. 1 wrought scrap	13.75 to 14.00
Heavy steel axle turnings	11.00 to 11.25
Stove plate	10.25 to 10.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Merchant Pipe.—Effective Monday, July 1, discounts on steel pipe 7 in. and larger were advanced one

point, or \$2 a ton. It will be recalled that on June 1 steel pipe up to 6 in. in size was advanced one point. The new demand for merchant pipe and oil well supplies is enormously heavy, all the mills being considerably behind in deliveries. Inquiries include about 20 miles of 8-in. pipe for a gas line in Oklahoma and about 70 miles of 12-in. for a local natural gas interest. The strike at the Pennsylvania works of the National Tube Company in this city is about over.

Chicago

CHICAGO, ILL., July 1, 1912.

Since last report prices have been advanced on plates, shapes, steel bars, bolts, spikes and cast iron pipe. In this territory the new prices on steel are not altogether new and in addition are of less importance than if the mills were able to offer accommodations to new business. For most of the local interests the month of June brought a continued heavy stream of specifications, resulting in another record output. It is estimated that approximately one-third of the tonnage of orders and specifications is new business, and there is little doubt that orders developed at a greater rate than it is possible to ship. With the exception of one order for 6000 tons of rails the sales reported during the past week have been unimportant. A renewal of moderate activity in car buying is noted, and inquiries for a total of nearly 6000 cars are in the market. Fabricated structural tonnage was not heavy, but in view of the better prices now prevailing is more attractive. Recent minimum prices for sheets, more particularly galvanized, have practically disappeared and quotations are made from a distinctly firmer position. The scrap iron market continues weak, owing to the lack of demand, but while prices for certain items are quotably less the weakness arises largely from lack of movement.

Pig Iron.—The local market has been rather colorless, notwithstanding several sales of Northern malleable and Southern foundry iron, some of them amounting to 1000 and 1500 tons. Melters are now buying iron to supplement earlier purchases and to meet requirements occasioned by a larger volume of business than was previously anticipated. Local furnaces are still selling upon the basis of \$14.50 at the furnace, although they maintain that the situation warrants an advance of at least 50c. per ton. Southern iron is quoted at \$11.50, Birmingham, for No. 2 foundry. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being nearly 50c. per ton. Other quotations are for Chicago delivery on prompt shipments as follows:

Lake Superior charcoal	\$16.25 to \$16.75
Northern coke foundry, No. 1	15.00
Northern coke foundry, No. 2	14.50
Northern coke foundry, No. 3	14.25
Northern Scotch, No. 1	16.00
Southern coke, No. 1 foundry and No. 1 soft	16.10 to 16.35
Southern coke, No. 2 foundry and No. 2 soft	15.60 to 15.85
Southern coke, No. 3	15.35 to 15.60
Southern coke, No. 4	14.85 to 15.10
Southern gray forge	14.35 to 14.60
Southern mottled	13.85
Malleable Bessemer	14.50
Standard Bessemer	16.75
Basic	14.50
Jackson County and Kentucky silvery, 6 per cent.	17.40
Jackson County and Kentucky silvery, 8 per cent.	18.40
Jackson County and Kentucky silvery, 10 per cent.	19.40

Rails and Track Supplies.—It is understood that the inquiry of the Canadian Northern Railroad for 10,000 tons of rails has not yet eventuated in an order. The Peoria & Eastern Illinois has ordered 6000 tons from the Illinois Steel Company. The strength of the situation as regards track supplies is evidenced by an advance in the price of both spikes and bolts to a minimum respectively of 1.60c. and 2c. We quote standard railroad spikes at 1.60c. to 1.70c., base; track bolts with square nuts, 2c. to 2.10c., base, all in carload lots, Chicago; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.20c. to 1.25c.; 16 to 20 lb., 1.25c. to 1.30c.; 12 lb., 1.30c. to 1.35c.; 8 lb., 1.35c. to 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Contracts for fabricated steel reported the past week totaled about 6500 tons. While this involved no single items of great importance, the fact that prices now show an average advance of \$5 to \$6 per ton causes this work to be considerably more desirable. Fabricating shops seem to be much better situated as regards the amount of work on hand. Among the contracts placed were 360 tons to the Llewellyn Iron Works for the General Pipe Line Company, California; 269 tons to Dyer Bros., for the Sum-

mer & Kaufman building, San Francisco; 640 tons to the Worden-Allen Company for the National Brake & Electric Company's foundry at Milwaukee; 1136 tons to the Indiana Bridge Company for the Busch-Sulzer Bros.-Deisel Engine Company, St. Louis; 437 tons to the Wisconsin Bridge Company for the St. Louis & San Francisco Railroad, girder spans; 346 tons to the Morava Construction Company for the Empress Theater, Chicago; 1298 tons to the American Bridge Company for the Washington-Sullivan building, Los Angeles; 260 tons to the Hansel-Elcock Company for the Wabash Avenue Y. M. C. A. building, Chicago; 258 tons to the American Bridge Company for the International Smelting & Refining Company; 343 tons for the Ball Bros. Glass Mfg. Company, Muncie, Ind., and 1200 tons for the Pacific Coast Pipe Company. A number of inquiries for cars are noted, including 1500 for the Denver & Rio Grande, 500 box cars for the Chicago, Milwaukee & St. Paul, 125 ore cars for the American Steel & Wire Company, 2000 box cars for the Grand Trunk and 3000 cars for another of the large trunk lines. The price of structural shapes from the mill having been advanced \$1 a ton, a similar advance in store prices has been made this week. We quote plain shapes for Chicago delivery, mill shipment, 1.48c. and from store 1.80c.

Plates.—Aside from the advance in price to the basis of 1.30c. Pittsburgh, there is little to report concerning plates in this market beyond the fact of a persistently heavy tonnage of orders. The sources of prompt delivery in this territory or elsewhere are rapidly disappearing. We quote for Chicago delivery, mill ent, 1.48c. and from store 1.80c.

Bars.—With the exception of Bessemer bars, of which some of the Eastern mills would still be glad to accept a tonnage, the steel bar capacity continues to be heavily oversold. Bar iron tonnage is likewise taxing the mill capacity, and while for very desirable specifications the price of 1.25c. Chicago might be made, for the average business 1.27½c. is the minimum quotation. We quote as follows: Bar iron, 1.27½c. to 1.30c.; hard steel bars, 1.30c.; soft steel bars, 1.43c., and from store, soft steel bars, 1.70c., Chicago.

Sheets.—Market conditions have brought about an improved situation in the matter of prices. For galvanized sheets in particular, quotations for which have been affected by the high price of spelter, maximum prices are being adhered to with more firmness. We quote, Chicago delivery, as follows: Carload lots, from mill, No. 28 black sheets, 2.08c. to 2.13c.; No. 28 galvanized, 3.18c.; No. 10 blue annealed, 1.58c. to 1.63c. Prices from store are: No. 10, 1.95c.; No. 12, 2c.; No. 28 black, 2.50c., and No. 28 galvanized, 3.60c.

Rivets and Bolts.—Following the recently announced advance in the price of steel bars, current quotations on rivets and bolts appear even less desirable than they have been from the standpoint of manufacturers. We quote as follows: Carriage bolts up to ¾ in. x 6 in., rolled thread, 80 and 15; cut thread, 80 and 7½; larger sizes, 75 and 7½; machine bolts up to ¾ in. x 4 in., rolled thread, 80 and 20; cut thread, 80 and 12½, larger sizes, 75 and 12½; coach screws, 80 and 20; hot pressed nuts, square head, \$6.30 off per cwt.; hexagon, \$7.10 off per cwt. Structural rivets, ½ in. and larger, 1.78c. base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Cast Iron Pipe.—Specifications involving any considerable tonnage have developed infrequently in this territory, but miscellaneous orders aggregate an attractive tonnage. The Massillon Iron & Steel Company was awarded the order for 2000 tons at Akron, Ohio. An inquiry for 1500 tons for Cincinnati is to be closed July 3. Prices have been advanced 50c. per ton. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$27.50; 6 to 12 in., \$25.50; 16 in. and up, \$25, with \$1 extra for gas pipe.

Wire Products.—Offsetting the decline in volume of trade with respect to barb and fence wire, the well sustained movement of wire nails is noteworthy. The crop outlook is sufficiently encouraging to warrant preparations for a heavy fall business. We quote as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78 to \$1.83; galvanized, \$2.08; polished staples, \$1.83; galvanized, \$2.13, all Chicago.

Old Materials.—The situation in the local scrap market remains about as it was last reported, with the weakness then apparent somewhat accentuated by another week of light demand for melters. That this consumers' demand will be resumed in the near future following the inventory period can hardly be doubted, and old material prices can be expected to regain whatever strength the present temporary situation has dissipated. The Atchison, Topeka & Santa Fe Railroad is offering a

list of scrap carrying about 6500 tons. We quote for delivery at buyer's works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	\$16.00 to \$16.50
Old steel rails, rerolling	13.25 to 13.75
Old steel rails, less than 3 ft.	12.50 to 13.00
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	14.00 to 14.50
Heavy melting steel scrap	11.75 to 12.00
Frogs, switches and guards, cut apart	11.75 to 12.00
Shoveling steel	11.75 to 12.00
Steel axle turnings	9.50 to 10.50

Per Net Ton.	
Iron angles and splice bars	\$13.75 to \$14.25
Iron arch bars and transoms	15.25 to 15.75
Steel angle bars	11.50 to 12.00
Iron car axles	19.25 to 19.75
Steel car axles	15.75 to 16.25
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
Steel knuckles and couplers	11.25 to 11.50
Steel springs	11.75 to 12.25
Locomotive tires, smooth	12.25 to 12.75
Machine shop turnings	7.25 to 7.75
Cast and mixed borings	6.25 to 6.75
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.25 to 7.75
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
Boiler punchings	13.00 to 13.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	10.00 to 10.50
Railroad malleable	11.75 to 12.25
Agricultural malleable	10.50 to 11.00
Pipes and flues	9.00 to 9.25

Philadelphia

PHILADELPHIA, PA., July 2, 1912.

Practically every producer has made an advance of \$1 per ton on billets, plates, shapes and steel bars, and are so well booked up that they are not anxious for business even at the higher level. Considerable new business has been entered in some lines at the new level. Deliveries by Eastern mills continue to harden and few makers will enter business for extended delivery. Premiums for prompt deliveries on heavy plates are being paid. The pig iron market, while quiet, has developed additional strength. The Eastern Pig Iron Association meeting, held this week, brought out optimistic expressions as to market conditions. Stocks on furnace yards showed a decline from last month and a heavy increase in orders was held back largely by the refusal of producers to sell, except at advanced rates. The proportion of the higher foundry grades in stock is extremely small, but increased production is checked by the scarcity and high cost of labor, as well as the deadlock in the coke market. At least one new contract for an ocean vessel has come to Eastern yards, requiring 2000 to 3000 tons of plates and shapes. Other boat business is still under negotiation. The old material market remains quiet, with prices practically unchanged. The usual suspension of mills for stock taking, the national holiday and minor repairs is expected to be brief, as producers are being pressed on all sides by requests for urgent deliveries.

Iron Ore.—There is practically no new business in either foreign or domestic ores. Importations during the week included 12,500 tons from Newfoundland, 6662 tons from Sweden and 11,200 tons from Cuba.

Pig Iron.—Advances are becoming more general, as producers find their sales aggregating more closely the productive rate, not only for a short period ahead but frequently through the third quarter and even beyond. Merchant furnaces operating but a limited number of stacks find it necessary to frequently swing their furnaces from foundry to steel making grades, and are therefore unable to accumulate any appreciable stock of the usual marketable grades. On No. 2 X foundry one producer now quotes \$15 and another \$15.50, at furnace, equal to approximately \$15.75 and \$16.25, delivered in this vicinity. The minimum quotation for standard brands of eastern Pennsylvania No. 2 X foundry is now \$15.50, delivered. Actual sales during the week have been confined to small transactions, of which there have been quite a fair volume. While there is little in the way of large inquiries before the trade an encouraging feature is the coming into the market for additional supplies by consumers who had been understood to have covered their requirements but find that they had underestimated their needs. Cast iron pipe makers have placed orders for additional quantities of low grade iron and a fair volume of business is still pending. One Delaware River melter, in the market for 6000 tons, is understood to have placed contracts, although announced sales of a block of Southern forge, at \$10.50, Birmingham, and one of Virginia low grade at \$12.50, furnace, do not represent the full tonnage. Negotia-

tions are still reported open for a block of malleable pig, which has been before the trade for a week or more. While no large sales of the higher grades of Virginia foundry iron are reported lots of a few hundred tons, together with small lot sales, are made for prompt and third quarter at \$13, furnace, for No. 2 X and \$12.75 for No. 2 plain. For October shipment sales of Virginia No. 2 X are being made at \$13.25, furnace. Some moderate inquiry for rolling mill forge is noted, with asking prices advancing; better than \$15, delivered here, has in one instance been quoted, but no sales are reported. The steel making grades are comparatively quiet. Small sales of off basic for prompt shipment are noted, with an inquiry for a moderate quantity for fourth quarter still before the trade. Basic is scarce and makers are not inclined to enter business for forward shipment at \$15.50, delivered. A better inquiry for standard low phosphorus is noted and prices are now flatly on a basis of \$20, delivered. The following range of quotations for standard brands for prompt and third quarter delivery in buyers' yards in this district is named:

Eastern Pennsylvania No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania No. 2 plain.....	15.25 to 15.50
Virginia No. 2 X foundry.....	15.80 to 16.00
Virginia No. 2 plain.....	15.55 to 15.75
Gray forge.....	14.75 to 15.00
Basic.....	15.50
Standard low phosphorus.....	20.00

Ferroalloys.—A moderate movement in 80 per cent. ferromanganese, principally in lots of a few hundred tons, for delivery over the first half of 1913, at \$48.50, Baltimore, is noted. Constant arrivals of ferromanganese, both at this port and at Baltimore, applying largely on contracts, has relieved the shortage, and little call for prompt delivery is heard. Approximately 4000 tons was received at this port during the past week. Very little demand for ferrosilicon is noted, and prices remain stationary.

Billets.—While a considerable volume of business was entered by producers last week, prior to the advance of \$1 a ton by Eastern makers, orders have been booked at the new price, at which mills are now holding firmly. Considerable business is still before the trade, both in rolling and forging steel. Mills are operating at capacity and are not inclined to enter contracts for extended delivery even at the new price basis, on which basic open hearth rolling billets are quoted at \$24.40 minimum, and ordinary forging billets at \$29.40 minimum, delivered here.

Plates.—All sellers in this district are now quoting the 1.45c. minimum, delivered here, for ordinary plates; in the majority of cases 1.50c. is quoted for miscellaneous small lots. While a large amount of business was placed just prior to the advance considerable has been booked at the new price level, and makers in the majority of instances refuse to enter contracts for extended delivery. Mills have sufficient business on their books to keep them busy for several months, and prompt shipments are gradually becoming scarcer. In some cases premiums of several dollars a ton have been paid for deliveries ranging over four weeks on universal plates. Specifications for car, locomotive and boat steel have been heavy, and negotiations are still pending for a considerable quantity of boat steel. One new contract for a steel vessel, requiring about 1500 tons of plates, has recently been entered by one of the Eastern yards.

Structural Material.—Little new business in bridge or building work has developed. Negotiations are pending on several good propositions, including 3000 tons for Philadelphia & Reading viaduct work, the Curtis Building addition and the Fairmount Hotel. In view of the higher prices for plain material there is a distinct hardening in prices of fabricated structural work. The recent advance in prices of plain shapes to 1.45c. minimum, delivered, is being generally maintained, although little but miscellaneous business has been entered at the new basis. Mills are exceedingly busy, some of them now being practically filled up to their capacity for the next two or three months.

Sheets.—A moderate day to day business in small lots, together with an occasional fair sized order, represents the general demand. In many cases prompt delivery is specified, but as mills are pretty fully engaged prompt shipments are not so freely obtained. While business is still being taken at 2.05c. to 2.10c., delivered here, on Western No. 28 gauge sheets Eastern mills making smooth, loose rolled sheets easily obtain 1/4c. to 1/2c. advance, and intimate that prices will take an upward turn.

Bars.—Prices of steel bars are now on a basis of 1.40c. delivered here, and while specifications against

low price contract bars have been heavy little business has been entered at the new basis. Makers of refined iron bars are making efforts to get prices on a higher basis, but owing to the light demand do not make much headway. Quotations range from 1.32 1/2c. to 1.35c., delivered here, although it is said that on desirable orders 1.30c. delivered, might still be done.

Coke.—There is practically no change in the furnace coke situation. Producers are still holding at around 2.50c., at oven, for second half contracts and consumers just as firmly refuse to pay the price and continue making purchases of prompt coke in varying quantities at prices close to \$2. A moderate volume of business is moving in foundry coke at unchanged prices. The following range of prices per net ton is named for delivery in buyers' yards in this district, inside prices representing quotations for prompt shipments:

Connellsville furnace coke.....	\$4.10 to \$4.70
Connellsville foundry coke.....	4.55 to 4.70
Mountain furnace coke.....	3.70 to 4.30
Mountain foundry coke.....	4.15 to 4.30

Old Material.—The market is extremely quiet, little moving in any grade. Mills, as a rule, would pay inside quotations for moderate lots, but are not anxious buyers, and sellers make no effort to force sales. Owing to labor shortages, both for unloading and operating, one Eastern consumer of heavy melting steel has temporarily held up deliveries. About the normal quantity of old material is being offered on railroad lists this month. The following range about represents the market for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap and crops.....	\$13.50 to \$14.00
Old steel rails, rerolling (nominal).....	14.75 to 15.25
Low phosphorus heavy melting steel scrap.....	16.25 to 16.75
Old steel axles.....	17.50 to 18.00
Old iron axles.....	24.00 to 25.00
Old iron rails (nominal).....	16.50 to 17.00
Old car wheels.....	14.00 to 14.50
No. 1 railroad wrought.....	15.50 to 16.00
Wrought iron pipe.....	12.50 to 13.00
No. 1 forge fire.....	12.00 to 12.50
No. 2 light iron (nominal).....	7.00 to 7.50
Wrought turnings.....	10.50 to 11.00
Cast borings.....	9.50 to 9.75
Machinery cast.....	13.75 to 14.25
Grate bars, railroad.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Railroad malleable (nominal).....	12.00 to 12.50

Cleveland

CLEVELAND, OHIO, July 2, 1912.

Iron Ore.—Some sales in small lots are still being made. One firm booked three orders during the week aggregating 35,000 tons. It is expected that a number of consumers will be in the market late in the year. Some ore has been withdrawn from the market and will be placed on stock piles awaiting better prices. However, it appears doubtful if sellers will be able to secure an advance in prices this season. Reports from some of the shipping docks show that the June movement was much heavier than May and that June shipments will aggregate around 7,000,000 tons. They would have been larger had not boats been delayed in getting cargoes at upper lake ports. The July movement is expected to be much heavier than that during June. We quote prices at Lake Erie docks as follows: Old Range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; Old Range non-Bessemer, \$3.05, and Mesaba non-Bessemer, \$2.85.

Pig Iron.—While the market is not particularly active, a fair volume of business in foundry grades is being placed, a number of sales having been made during the week to small Ohio foundries in lots of 200 to 500 tons for the last half delivery. One local furnace reports sales during the week aggregating 2000 tons, all for outside shipment, at \$13.25 at furnace. There is very little Cleveland inquiry. The market is firm and prices on foundry grades are stiffening up. Two local interests selling Valley iron have advanced prices during the week to \$13.50, Valley furnace, for No. 2 foundry, and some tonnage has been sold at the advance. Local furnaces are still quoting No. 2 foundry at \$13.25, Cleveland, for outside shipment. This price is believed to have been slightly shaded this week on the sale of 500 tons to a central Ohio consumer. There is an inquiry from northern Ohio for 300 tons of No. 2 foundry. The Southern market is quiet. Price is firm at \$11, Birmingham, for No. 2 foundry. For prompt shipment and last half we quote, delivered Cleveland, as follows:

Bessemer.....	\$15.15
Basic.....	13.75
Northern No. 2 foundry.....	13.75
Southern No. 2 foundry.....	13.35
Gray forge.....	13.25
Jackson silvery, 8 per cent. silicon.....	\$17.50 to 17.55

Coke.—The deadlock between producers and consumers over the furnace grade continues. The market is very firm, \$2.25 to \$2.50 per net ton at oven being asked for prompt shipment. The same price is quoted for last half contracts. There is not much demand for foundry grades. Many consumers are unwilling to contract at present prices and are buying in small lots for prompt shipment. We quote standard Connellsville 72-hr. foundry coke at \$2.50 to \$2.75 per net ton.

Finished Iron and Steel.—While little new business in steel bars, plates and structural material has come out since the advance of \$1 a ton in price it appears that the new quotations will be strictly adhered to. Consumers seem to be showing little concern over prices, being interested entirely in the question of deliveries. A further advance of \$1 a ton on plates and shapes within the next few weeks is predicted. Considerable tonnage for structural material has been sold at the 1.25c. price to consumers who were unable to get deliveries on lower priced contracts from other mills. Specifications during the week were very heavy, few consumers not taking all the steel on low priced contracts that expired July 1. Considerable new inquiry is coming out. Jobbers are in the market for bar material for the fourth quarter delivery and there is some inquiry for plate and structural contracts for the fourth quarter and for additional tonnage for the third quarter. Twisted soft steel bars for reinforcing work are scarce and some sales are being made at premium prices. Hard steel is firm at a minimum of 1.15c. Pittsburgh. Local jobbers advanced stock prices July 2 to 1.75c. for steel bars and 1.85c. for plates and structural material. Warehouse business is good and jobbers are behind on deliveries in some lines. There is a good demand for sheets on contract and prices are steady. Sheets are quoted at 1.90c. to 1.95c. for No. 28 black and 2.95c. to 3c. for No. 28 galvanized. The demand for rivets is active. A local manufacturer has advanced its quotation to 1.60c. Pittsburgh for structural and 1.70c. for boiler rivets. Bar iron is very firm at a minimum quotation of 1.30c. Cleveland. The demand holds up well. The July shut down of the local bar iron mills will probably be of shorter duration than usual. A local consumer is in the market for 1000 tons of slabs. The Massillon Iron & Steel Company was low bidder for 2000 tons of cast iron pipe for the Akron, Ohio, water works department.

Old Material.—The market is quite active, particularly in heavy melting steel. Consumers are taking material freely on contract. Local dealers sold both to Cleveland and Valley mills during the week. Most dealers expect better prices and are not offering a great deal of scrap from yard stocks at present quotations. Buyers, however, think that prices will remain about stationary and are not anxious to buy for future delivery. Bids on scrap lists were received Tuesday by the Pennsylvania Railroad, the Pennsylvania Lines West and the Erie Railroad. The market is very firm but prices are unchanged with the exception of a slight advance on turnings. Dealers' prices, f.o.b. Cleveland are as follows:

Per Gross Ton.

Old steel rails, rerolling.....	\$12.75 to \$13.00
Old iron rails	14.00 to 14.50
Steel car axles	17.50 to 18.00
Heavy melting steel	12.50 to 12.75
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	12.75 to 13.00
Light bundled sheet scrap.....	9.50 to 10.00

Per Net Ton.

Iron car axles	\$18.50 to \$19.00
Cast borings	7.25 to 7.50
Iron and steel turnings and drillings.....	7.75 to 8.00
Steel axle turnings	8.50 to 8.75
No. 1 busheling	10.75 to 11.00
No. 1 railroad wrought	12.00 to 12.25
No. 1 cast	11.25 to 11.75
Stove plate	9.00 to 9.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, July 3, 1912.—(By Telegraph.)

Pig Iron.—There is good foundation for the claim of firmer prices, especially in the South. While \$11 iron has not disappeared, very few furnaces will take business at that price for third quarter. The high price of coke has also induced the Hanging Rock makers to hold out firmly for a minimum of \$13.50, Ironton. Inquiry shows considerable improvement. For last half shipment two central Indiana melters are expected to close for 1000 and 600 tons respectively of Southern foundry iron. From the same territory there are several requests for prices on smaller tonnages of both North-

ern and Southern foundry grades. A northern Ohio melter is in the market for 1500 tons of either Northern or Southern foundry iron for fourth quarter movement and 1000 tons for the first quarter of next year. Another consumer in that neighborhood wants 500 tons of No. 1 soft for shipment about January. Malleable also shows signs of awakening, and 1000 tons was taken for third quarter shipment by a northern Ohio firm, and there is an order pending from the same district for 1500 tons for the fourth quarter. Malleable is quoted firm at \$13.50, Ironton. Southern foundry iron sales include 1000 tons of No. 3 for a northern Indiana manufacturer, shipments to be completed before January 1. Specifications on contracts are satisfactory and there is the usual percentage of orders coming in from smaller consumers. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft.....	\$15.00 to \$15.25
Southern coke, No. 2 foundry and 2 soft.....	14.50 to 14.75
Southern coke, No. 3 foundry.....	14.25
Southern coke, No. 4 foundry.....	14.00
Southern gray forge	14.00
Ohio silvery, 8 per cent. silicon.....	17.20 to 17.70
Lake Superior coke No. 1.....	14.95
Lake Superior coke No. 2.....	14.70
Lake Superior coke No. 3.....	14.45
Basic, Northern	14.45
Standard Southern car wheel.....	25.25 to 25.50
Lake Superior charcoal.....	16.75 to 17.25

(By Mail)

Coke.—The deadlock between coke producers and blast furnace men over prices for the last half is yet unbroken, and pig iron makers in the Hanging Rock district are determined to buy only for a short time supply rather than sign up at present contract quotations. For prompt shipment 48-hr. brands are quoted all the way from \$2.10 to \$2.25 per net ton at oven, Connellsville, and contract figures range from \$2.25 to \$2.50. In the Pocahontas and Wise County fields furnace coke is obtainable as low as \$1.90 to \$2 at oven for nearby shipment, and on last half business several leading producers are willing to accept \$2.10 per net ton at oven, but the majority of them are quoting \$2.25. A Southern furnace operator has signed up through a local firm for 35,000 to 40,000 tons of Wise County 48-hr. coke to be shipped during the next 12 months. There has been a little more activity in foundry coke, and the average price in all three fields is \$2.50 at oven, but some Pocahontas 72-hr. coke is quoted around \$2.40 for either prompt or last half shipment. Several tentative inquiries have been received for foundry coke to be shipped during the first half of 1913, but the lowest figure quoted on this delivery is \$2.75 per net ton at oven, and the producers are said to be very indifferent about booking any business at this price.

Finished Material.—Mill agencies generally report a very brisk demand for structural material and steel bars. Wire nails and sheets are still slow, but as the summer season advances it is expected that the trade in these two commodities will materially improve. The recent advance to 1.25c., Pittsburgh basis, on steel bars, and 1.30c. on structural shapes, is being strictly adhered to, and the mills are even now refusing to take care of old customers at previous quotations. The local warehouse prices have advanced slightly and steel bars are quoted around 1.65c. to 1.70c. and structural material, cut to lengths if desired, 1.70c. to 1.80c.

Old Material.—Two of the larger users of scrap in this territory are expected to close down soon for repairs, and with the exception of the demand from local foundries, scrap iron dealers are compelled to depend on the outside trade. Prices continue weak, with no immediate prospect of an advance. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap.....	\$8.75 to \$9.25
Old iron rails	12.75 to 13.25
Relaying rails, 50 lb. and up.....	20.00 to 21.00
Rerolling steel rails.....	11.00 to 11.50
Melting steel rails	10.00 to 10.50
Heavy melting steel scrap.....	10.00 to 10.50
Old car wheels	12.00 to 12.75

Per Net Ton.

No. 1 railroad wrought	\$10.50 to \$11.00
Cast borings	6.25 to 6.75
Steel turnings	6.25 to 6.75
No. 1 cast scrap	10.75 to 11.25
Burnt scrap	7.50 to 8.00
Old iron axles	16.00 to 16.50
Locomotive tires (smooth inside).....	11.75 to 12.25
Pipes and flues	7.00 to 7.50
Malleable scrap	8.50 to 9.00
Railroad tank and sheet scrap.....	6.50 to 7.00

Birmingham

BIRMINGHAM, ALA., July 1, 1912

Pig Iron.—Small lots are going at \$11.50 and \$11.75. There have been no large sales. A leading interest has not sold 1000 tons in all June, not having had the iron to sell, its own requirements and previous contracts consuming the output. This company is, practically out of the market except for fourth quarter, for which it is quoting \$12. The Republic Iron & Steel Company also adheres to \$12 for all future deliveries. Another large interest is out of the market, not even quoting for fourth quarter. High authorities declare that the local iron situation is due to comparatively small production with heavy home consumption, especially by the large pipe concerns, to which might be added the rail and rolling mills. Present prices are dictated and warranted by Southern consumption. It is doubtful if the prices quoted and obtained in Southern territory could be secured for the same iron in competitive points north of the Ohio River, but they are firm and tending to advance. The only company with stocks worth the mention has sold its make during the month and further reduced its holdings. With \$12 on No. 2 the basis for fourth quarter delivery, the quotations for spot and third quarter by those concerns which have iron to sell for those deliveries are as follows:

No. 1 foundry and No. 1 soft.....	\$12.00
No. 2 foundry and No. 2 soft.....	\$11.50 to 11.75
No. 3 foundry	11.00 to 11.25
No. 4 foundry	10.75 to 11.00
Gray forge	10.50 to 10.75
Basic	10.75 to 11.25
Charcoal iron	22.50 to 23.00

Cast Iron Pipe.—Quotations have been revised and are somewhat advanced. The old custom of making a differential of \$1 a ton between 4 in. and larger sizes has been changed and the differential is now \$2 a ton. Manufacturer explain that the increase in the differential is necessitated by the demand for small sizes and the increased cost of production. Revised prices are as follows: 4 in., \$24; 6 to 8 in., \$22; 10 in. and up, \$21.50, with \$1 extra for gas pipe.

Coal and Coke.—Domestic coal dealers are putting in larger stocks than usual and the steam coal users are likewise taking much greater tonnage for future use than heretofore. Alabama's output for the half year is estimated at 9,000,000 tons. Coke is quiet but steady at \$3.25 to \$3.75 per net ton at oven.

Old Materials.—The demand from rolling mills is reported as inactive, but the foundries are taking on a fair amount of light cast. Dealings have been principally local and for nearby Southern delivery. Prices have been changed to the following, f.o.b. dealers' yards:

Wrought iron car axles.....	\$15.00 to \$16.00
O'd steel axles	13.50 to 14.50
Old iron rails	13.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00
No. 1 country wrought.....	8.50 to 9.00
No. 2 country wrought	8.00 to 8.50
No. 1 machinery	9.00 to 9.50
No. 1 steel	10.00 to 10.50
Tram car wheels	10.00 to 10.50
Standard car wheels	11.50 to 12.00
Light cast and stove plate	8.00 to 8.50

San Francisco

SAN FRANCISCO, CAL., June 25, 1912.

The second quarter has been productive of more business than was expected and conditions are still improving. Aside from the natural stimulus of advancing prices there has been a fair increase of demand from small consumers for current requirements. The tonnage has also been augmented by large construction projects, including harbor work, several electric power dams, railroad extensions and irrigation development, as well as by increased activity in building. Some of the largest requirements of the year have been covered and it is not certain whether the buying movement will be maintained, but local merchants and manufacturers are fairly confident of the future.

Bars.—The tonnage of reinforcing bars continues heavy. Many small contracts are coming out for local buildings and general contracts have just been let for the Geary street car house and pier 26, both of which will require a large tonnage, while other important buildings are in prospect. Large inquiries are also coming from outside construction jobs. Merchants' and manufacturers' specifications for soft steel bars are extremely heavy and somewhat more activity is noted in the distributive trade. The tonnage may be slightly in excess of the requirements for current consumption, but no unduly heavy stocks are being accumulated. Jobbing prices have been advanced slightly, bars from

store, San Francisco, being quoted at 2.30c. for steel and 2.20c. for iron.

Structural Material.—Some local contractors still complain of quiet business, though the tonnage is gradually increasing. The largest single jobs let recently are at Los Angeles, where the Baker Iron Works has a 1300-ton contract for the Washington Sullivan building, and the Llewellyn Iron Works has the Title Guarantee building, about 800 tons. Plans will soon be out for several other Los Angeles buildings. Dyer Bros. have taken the Sommer & Kaufman building contract, this city, about 200 tons, and the Ralston Iron Works has the London, Liverpool & Globe Insurance building, requiring a similar tonnage. Grant Smith & Co. have the general contract for pier 26 and will place the steel work shortly. Plans have been approved for the manual training high school in Oakland and the design of Bakewell & Brown has been accepted for the new city hall, this city. New figures are being taken on the state armory, this city, much of the steel having been eliminated. Plans are due to come up shortly for the St. Francis Hotel addition and the Sharon Estate is having plans drawn for another seven-story building. Several good-sized buildings are planned for Oakland. Some of the coast fabricators still appear willing to take work at low prices.

Rails.—The tonnage of standard sections is well maintained, with occasional fairly large orders and a steady run of small business. The San Diego, Riverside & Los Angeles Railroad recently placed an order for 1000 tons and figures are being taken on several other short lines, both here and in the north. Light rails are extremely active, and as little foreign material is arriving, the largest handlers are buying supplies in the East.

Sheets.—Most manufacturers of riveted pipe are still operating at full capacity and their specifications are heavier than for some time. The tonnage required by local industries is also gradually increasing and outside distributive business is well maintained. Supplies in store are light except with the Pacific Hardware & Steel Company, which has just received a cargo of 2100 tons of steel, mostly galvanized sheets, by steamer, 81 days from Philadelphia. Mill agents are not booking orders for delivery later than July and are not anxious for business beyond the present month.

Plates.—No new inquiries of unusual magnitude are noted, but there is considerable tank work in prospect and a number of shipbuilding jobs are projected. A material increase of marine construction on this coast is expected within the next year. The jobbing movement is gradually increasing and specifications on old contracts are fairly large. The Llewellyn Iron Works, Los Angeles, has taken a large boiler contract for pumping stations on the General Pipe Line Company's oil line. The city of Seattle, Wash., will shortly let a contract for a \$50,000 steel standpipe and is preparing plans for a larger one.

Merchant Pipe.—Very little curtailment in the small trade has followed the buying which accompanied the recent advance, as actual consuming requirements are fairly large. Merchants show no disposition to put in heavy stocks, but specifications continue heavy, most large buyers having increased their allotments for the second quarter. Mill agents are still very reluctant to take any business for third-quarter shipment and are accepting no orders beyond the end of July. No large individual orders are coming from the oil fields, but the aggregate tonnage for that district is increasing. Waterworks inquiries are also fairly numerous.

Cast-Iron Pipe.—Scattering small orders are coming out fairly well but in the absence of large contracts business is rather quiet. Sacramento has ordered a small lot of 12-in. pipe, but there is nothing else worth mentioning. No cities are in the market just now, but a number of large inquiries are expected, as many bond issues have been voted for waterworks construction. San Diego will probably be out for about 5000 tons in the next month or two.

Pig Iron.—The immediate needs of local melters are fairly well supplied, and as they are not yet ready to place orders for third-quarter delivery, the market is dull. Some substantial inquiries are expected to develop, however, within the next two or three weeks. No. 2 Southern foundry iron is still quoted around \$22 f.o.b. San Francisco, but increasing firmness is noted. A small lot of foreign iron recently arrived at Portland, Ore.

Old Material.—The local market shows little new feature, the movement of cast-iron scrap being limited to small sales, while large deliveries are being made on former sales of steel melting scrap and old rails. Prices are quoted as follows: Cast-iron scrap, per net

ton, \$14; steel melting scrap, per gross ton, \$11.50 to \$12; wrought scrap, per net ton, \$12.50 to \$15; rerolling rails, per net ton, \$11.

R. Lee Hall, formerly of Louisville, Ky., is now associated with the San Francisco office of the United States Cast Iron Pipe & Foundry Company. John W. Geary, who has been with this office, has been appointed sales agent for the company covering Oregon and Washington, with his office at Portland.

The Rudge-Merle Company, this city, has taken a contract amounting to \$61,000 for ornamental iron and bronze work on the 10-story building of the Standard Oil Company at Bush and Sansome streets.

Buffalo

BUFFALO, N. Y., July 2, 1912.

Pig Iron.—There has been comparatively little doing either in the way of inquiry or orders the past week. The aggregate of small orders placed in 100 or 200-ton lots in foundry grades amounted to a considerable tonnage, but was not so large as for the previous week. A number of inquiries for special grades are noted, including charcoal, high silicon, high phosphorus and high manganese irons. It is also reported that a purchase was made covering a recent inquiry for a few thousand tons of basic from a Canadian steel foundry. Prices are standing stiffly owing to the trend toward higher cost of production, but there is no quotable change in schedules. The range of prices for third and fourth-quarter delivery is as follows, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	14.00 to 14.25
No. 2 plain.....	14.00
No. 3 foundry.....	13.75 to 14.00
Gray forge.....	13.50 to 13.75
Malleable.....	14.25 to 14.50
Basic.....	14.25 to 14.50
Charcoal, according to brand and analysis..	15.75 to 17.50

Finished Iron and Steel.—Specifications have been very heavy, being increased to some extent by the cleaning up of contracts expiring June 30. The tonnages were well distributed on all lines, although plates and heavy structural material reached larger totals and required more extended deliveries than other products. Many mills are completely booked in general lines on tonnages running close to the end of the year. Agencies are holding firmly to the advanced prices established last week, and users are apparently satisfied to accept them without demur for forward requirements. Warehouse prices have advanced \$2 per ton on bars, plates and shapes, equivalent to 1.80c. f.o.b. Buffalo for bars and 1.90c. for plates and shapes in any quantities. Cold-rolled shafting has advanced to 65 per cent. discount for carloads and 60 per cent. and less for smaller quantities. The demand for nails and wire products is well sustained, some increase in specifications being noted on account of the closing up of expiring contracts, and the price situation is very strong. In fabricated structural steel quite a number of awards on small contracts have been made. The American Bridge Company has received contract for steel for the rebuilding of the Eastman Kodak Company's factory No. 1 at Rochester, about 200 tons. The Eastern Concrete Steel Company, Buffalo, has been awarded general contract for the New Theater adjoining the Hotel Iroquois, Buffalo, taking 150 tons, and was low bidder for the Queen City Improvement Company's six-story stone building, Buffalo, taking 500 tons, but it is possible that the specifications may be revised before the contract is awarded. The McClintic-Marshall Construction Company has received contract for the structural steel for the General Cyanide Company's extensive plant at Niagara Falls, Ont., about 400 tons; also for the New York Central Railroad subway work at Utica, 150 tons. Bids are soon to be received for bridge work for the Lackawanna Railroad Company's tracks over the Elmwood avenue subway, Buffalo, about 500 tons, and for steel for subway and viaduct work to eliminate grade crossings of the Lackawanna and the Erie railroads at Delaware avenue and North Main street, Buffalo.

Old Material.—The market is dull, with no indications of improvement apparent. Local consumers are buying very little scrap at present, a few sales of borings and turnings being the principal transactions reported. Some business has been done with the Pittsburgh district, but the total was of small proportions. Most dealers are holding stock awaiting a better demand and with the expectation of an improvement in prices later. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.75 to \$13.25
Low phosphorus steel.....	15.75 to 16.00
Old steel axles.....	16.50 to 17.25
Old iron axles.....	21.00 to 21.50
No. 1 railroad wrought.....	14.00 to 14.75
No. 1 railroad and machinery cast scrap.....	13.50 to 14.00
Old car wheels.....	12.75 to 13.25
Railroad malleable.....	11.50 to 12.25
Boiler plate, sheared.....	13.75 to 14.25
Locomotive grate bars.....	11.00 to 11.25
Wrought pipe.....	9.50 to 10.00
Tank iron.....	10.00 to 10.25
Wrought iron and soft steel turnings.....	8.25 to 8.50
Clean cast borings.....	7.25 to 7.50

Boston

BOSTON, MASS., July 2, 1912.

Old Material.—The market is dull, the volume of transactions being small, but prices have not changed. Dealers expect a lower market, following the tendency of the summer season. The quotations given below are of prices offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel.....	\$10.25 to \$10.75
Low phosphorus steel.....	11.45 to 11.95
Old steel axles.....	14.00 to 14.50
Old iron axles.....	17.00 to 18.00
Mixed shafting.....	13.00 to 13.50
No. 1 wrought and soft steel.....	10.00 to 10.50
Skeleton (bundled).....	8.25 to 8.75
Wrought iron pipe.....	9.25 to 9.75
Cotton ties.....	7.75 to 8.25
No. 2 light.....	4.50 to 5.00
Wrought turnings.....	7.25 to 7.75
Cast borings.....	6.25 to 6.75
Machinery, cast.....	12.50 to 13.00
Malleable.....	8.75 to 9.25
Grate bars.....	6.00 to 6.50
Stove plate.....	8.00 to 8.50
Cast iron car wheels.....	11.75 to 12.00

St. Louis

ST. LOUIS, Mo., July 1, 1912.

Opinions on market conditions are in the line of optimism, chiefly due to the large takings on contracts and the urgent demand for quick shipments, showing that materials are needed by consumers. Collections are in good shape.

Pig Iron.—The tendency in pig iron is upward, though there is no sharp demand. There are some interests asking \$12 for No. 2 Southern, Birmingham basis, but the true quotations may be put at \$11.25 for third quarter, \$11.75 for fourth quarter and \$11.50 for last half. Northern iron is quotable at \$13.50 to \$14 for No. 2, Iron-ton basis, with practically nothing moving. The sales of the week include one of 500 tons and one of 1000 tons of No. 2 Southern and 1000 tons of car-wheel iron, the rest being on small orders, but with a reasonably good total. The inquiries in the market are all for small lots, the largest being for 150 tons of No. 1 soft Southern. Movement on contract specifications is of liberal character, no requests to hold back being received but many to hurry forward. This is as true of the stove plants, usually dull at this time, as of the other consumers.

Coke.—There are no inquiries in the market. The prices quoted are all nominal and are in consonance with the oven figures at Connellsville and in Virginia. At the same time movement forward on existing contracts is in good volume and the aggregate keeps pace with other lines.

Finished Iron and Steel.—In finished steel demand has kept up briskly, the business being as pushing as at any time recently reported. Standard steel rail sales include 2500 tons for an Arkansas road, 1000 tons to a southwestern road and an additional specification from the Chicago & Eastern Illinois of 5000 tons. Track fastenings are moving in increasing volume and the year's consumption will unquestionably be far in excess, in this territory, of the contracts made earlier in the year, showing that construction and repair work has been going on continuously. In light rails the demand has been good for the season of the year, especially from the coal interests, which are making extensions. In structural material the specifications on contracts have been liberal and quick shipment is the

demand most frequently heard. The price is 1.30c. Pittsburgh, and this is not holding buyers out of the market. In plates the price is also 1.30c. and premiums are not infrequent in quick delivery orders. Bars are in the same condition as structural and the price of 1.25c. is being well received. Customers generally are reported optimistic by the trade, even the wagon makers, who look for a good fall business.

Old Material.—The scrap market has been upset by the closing of the Tudor plant of the Republic Iron & Steel Company on the East Side and there are reports that it is closed permanently. These cannot be confirmed. It is also reported that a new company is forming to operate the Tudor plant independently, but the interested parties decline to commit themselves. The cutting off of the consumption of the Tudor plant has sent scrap downward. The lists so far on the market for the week here include 700 tons from the Missouri Pacific and 400 tons from the New Orleans Northeastern. Generally, the market is quiet at the declines noted. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$14.00 to \$14.50
Old steel rails, rerolling	12.00 to 12.50
Old steel rails, less than 3 ft.	12.00 to 12.50
Relaying rails, standard section, subject to inspection	22.00 to 22.50
Old car wheels	13.50 to 14.00
Heavy melting steel scrap	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Per Net Ton	
Iron fish plates	\$12.00 to \$12.50
Iron car axles	17.00 to 17.50
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.25 to 11.75
Railway springs	10.00 to 10.50
Locomotive tires, smooth	12.00 to 12.50
No. 1 dealers' forge	8.00 to 8.50
Mixed borings	6.25 to 6.75
No. 1 busheling	9.00 to 9.50
No. 1 boilers, cut to sheets and rings	7.50 to 8.00
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.00 to 8.50
Pipes and flues	7.50 to 8.00
Railroad sheet and tank scrap	7.50 to 8.00
Railroad grate bars	8.50 to 9.00
Machine shop turnings	7.00 to 7.50

The German Iron Market

Generally Favorable Reports

BERLIN, June 20, 1912.

The general market situation has been under more careful scrutiny for a week by stock market operators than hitherto, owing to the fact that some price cutting in bar steel is now conceded. Although this appears to be confined to only a few mills, it made a bad impression on the Bourse and caused some depression in iron shares for several days. After further consideration, however, speculators in shares have come to the conclusion that this price cutting is not a serious matter. It occurs only on orders for delivery at remote periods, and comes from a few mills that are trying to secure orders as far ahead as possible. The prices mentioned for such selling are 117.50 to 118.50 marks, but most of the mills continue to sell at 120 to 122 marks. No advances have been reported this week, but it is assumed now as certain that the band-iron manufacturers will mark up their price by 5 marks per ton since actual sales have already been made at the higher rate.

The Steelworks Union held its monthly meeting today and gave out a more optimistic market survey than usual. It says that the home demand for semi-finished steel continues active, and that in many cases the extremely urgent calls of consumers for shipment can not be met; also that the arrival of foreign specifications continues heavy. The foreign market for heavy steel rails remains favorable, and the demand promises to increase within the next few months. Home and foreign buying of rails for mines continues very active. The home demand for structural shapes is very brisk, and the July shipments are expected to register a further increase. The foreign demand for beams has further expanded.

The Union's optimistic remarks about structural shapes are fully confirmed by the May shipments, which amounted to 214,300 tons, an amount never reached before, except in the month of March for the past three years—a month in which shipments are artificially increased owing to the rounding out of the year's business. This heavy movement is all the more remarkable in view of the fact that the building trade is reported as being nearly everywhere in a very unsatisfactory position. Apparently business in this department has been largely in construction shop supplies. The aggregate shipments of class A products reached

535,700 tons, being 67,400 tons more than for April and about 3400 tons more than for May, 1911.

The selling agency for ship plates reports shipments of 23,300 tons in May, against 22,000 tons in April. New orders taken were nearly as great as the month's shipments, leaving the orders booked almost unchanged at 230,000 tons. A movement is on foot for an organization covering plates, sheets, tubing, and wire rods under the auspices of the Union; it is reported that the prospects for a favorable result are good. There is trouble in the existing organization of the wire rod makers, and it is feared that it cannot be renewed as an independent body. Talk about reorganizing the bar trade is also still heard, but the outlook has in no way improved. The various dealers' organizations for beams conferred several days ago on their renewal, with the result that the prolongation appears highly probable, as also a satisfactory arrangement with the Union.

The Belgian market again sends in news of rising prices. Pig was marked up 1 to 2 francs, making the new prices 76 to 77 francs for foundry and 74 to 75 for puddling iron. The export price for bands has also been raised 2 francs to 142 to 144 francs, and the home price 5 francs to 190 to 200 francs. From Longwy, France, an advance of beams by 7.50 francs is reported.

Good Buying of British Pig Iron

A Further Advance This Week—An Alabama Producer Offering Forge Iron

(By Cable)

MIDDLESBROUGH, England, July 3, 1912.

The general feeling is more optimistic. A large business has been done in pig iron, both by consumers and speculators. Stocks in Connal's stores are 310,127 tons, against 313,693 tons last week and 328,430 tons two weeks ago. The warrant market has shown some fluctuations in the week and high point was reached on Monday at 57s. 4½d. An Alabama furnace interest is testing the market here for gray forge and basic iron, but no sales are reported.

German makers are offering sheet bars at 105s. f.o.b. Antwerp, deliveries to December, and have sold billets at 100s. Antwerp for the first quarter. Tin plates are dull. Two weeks ago the American mills picked up a small oil size order (14x18¾ and 20x10) for the East, to the disgust of Welsh manufacturers, who say that if given the opportunity they could have undercut the Americans and taken the business. The Central Railway of Brazil is inquiring for 10,000 tons of rails. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 56s. 9½d., against 56s. 1d. one week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 57s. 3d., an advance of 9d. in the week.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 17s. 6d.

German 2-in. billets, f.o.b. Antwerp, 100s.

German basic steel bars, f.o.b. Antwerp, £5 17s.

Steel bars, export, f.o.b. Clyde, £7 15s.

Steel joists, 15-in. export, f.o.b. Hull or Grimsby, £6 17s. 6d.

Steel ship plates, Scotch, delivered local yard, £7 17s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 2s. 6d.

Steel rails, export, f.o.b. works port, £6 7s. 6d. to £6 10s.

Tinplates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 7½d., October-December.

New York

NEW YORK, July 3, 1912.

Pig Iron.—Several purchases of considerable size were closed in the past week, including 5000 tons for a New England foundry, 3000 tons for an interest in the Hudson Valley and 2000 tons for a Newark foundry manufacturing sanitary castings. With this business disposed of that has been under negotiation for the past two weeks there is no very large amount in sight. Eastern Pennsylvania furnaces which generally report an increase in orders and a decrease in stocks in June are holding rather firmly to the position they have recently taken, but the fact remains that most of the business done is at slight concessions and the market continues to show the irregularity in prices that has been reported for the past two or three weeks. Large buyers are pretty well covered for the remainder of the year, and those of the more numerous class of foundries which

have been following the market rather closely and buying from three to four months ahead are not particularly interested in offers that have been brought before them lately. There is some business pending in basic iron in eastern Pennsylvania and one contract is likely to be closed on a basis of \$15.50 delivered, as against \$15.25 on the previous transaction of the same buyer. Without expectation of any early buying movement or of any change in the relation of supply and demand by the blowing in or blowing out of furnaces, the market may still be quoted as follows for Northern iron at tide-water: No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.50 to \$15.75; No. 2 plain, \$15 to \$15.25. Southern iron is quoted at \$15.75 for No. 1 foundry and \$15.25 to \$15.75 for No. 2 foundry.

Finished Iron and Steel.—Firm prices at the recently established higher basis and a fair run of new business in spite of that fact and considerable in the way of sizeable inquiries have shown unexpected strength to finished lines in this territory. In fact there is some talk of even further advances. Unspecified material has been pretty generally canceled where the buyer failed to take his contract amounts, but this has not been large in the aggregate. Where the buyer still has a chance to close at the lower level the arrangement involves pending work not yet definitely settled by third parties, but the mills' representatives are using the price advance as a strong lever for quick action. It seems clear that such new business as may be done at less than 1.25c., Pittsburgh, for steel bars will not be large in proportion to the total value of material sold. The promise of a good, steady business in the summer is indicated perhaps by the fact that one large steel company's New York office had more inquiries last week, some of fair size, than for a good many months. Bar iron business has also been very good, but manufacturers are cautious about making an advance in price. In the fabricating field a new large proposition has taken definite shape in the request for bids July 8 for 4000 to 5000 tons for ferry house and train sheds for the Central Railroad of New Jersey in Communipaw. The New York Central has added still further to its inquiries, the latest including seven bridges on the Rome and Hudson branches, involving 700 tons and transmission poles at Croton-on-Hudson requiring 100 tons. The Baltimore & Ohio has placed 1400 of the steel underframes, the remainder of the extended delivery proposition being still undecided. The Virginian Railway wants 750 all steel hopper cars and the Denver & Rio Grande 1500 cars of different kinds; the Southern Railway has an inquiry out for 41 passenger cars; the Spokane, Portland & Seattle for 30 passenger cars, and the New York Railways for 150 cars of the low body type. In addition to recent structural steel awards may be mentioned the following: Lewis F. Shoemaker & Co., 400 tons for a substation for the Edison Illuminating Company of Boston; Phoenix Bridge Company, 300 to 400 tons for two of the three bridges recently considered by the Boston & Maine Central Railroad; Pennsylvania Steel Company, 1200 tons for the Brooklyn Bridge work, award of the general contract of which was mentioned last week. The Lehigh Valley Structural Steel Company's recent awards, one or two of which have already been mentioned, include loft building, West Thirty-fifth street; loft building, Twenty-fifth street and Lexington avenue; loft building, Thirty-first street and Fourth avenue; Child's restaurant building, Thirty-second street; apartment building, West End avenue and Ninety-first street; hotel building, 124th street and Seventh avenue. Quotations are: Steel bars, 1.41c. to 1.46c.; plain structural material and plates, 1.46c. to 1.51c.; bar iron, 1.32c. to 1.37c., all New York. Plain material from store, 1.80c. to 1.90c.

Cast Iron Pipe.—About this time a lull usually occurs in the buying of pipe, but this year seems to be an exception, as private buying continues remarkably active. A particularly strong demand is observed for pipe of small diameters, such as 4 and 6 in. Eastern foundries have been cleaning up their stocks of pipe and have less on hand than for a long time. Public lettings are few and small, but the foundries are getting sufficient business from private buyers to more than overcome the lack of municipal orders. Prices are firmer, and carload lots of 6 in. are now quotable at \$22 to \$23 per net ton, tidewater.

Old Material.—Some demand for steel scrap is coming from a few consumers in eastern Pennsylvania who either failed to gauge their requirements or who are pursuing the policy of purchasing in moderate quantities for their immediate necessities. Other mills having large contracts with dealers are requesting shipments to be deferred until after July 15. Eastern Penn-

sylvania mills are unable to run to their capacity because of a scarcity of labor. Rolling mills are buying in small quantities only, while foundries are doing little in the scrap market. Dealers' prices, per gross ton, New York and vicinity, are quoted as follows:

Old girder and T rails for melting.....	\$10.75 to \$11.25
Heavy melting steel scrap.....	10.75 to 11.25
Relaying rails.....	20.50 to 21.00
Rerolling rails (nominal).....	12.50 to 13.00
Iron car axles.....	20.50 to 21.00
Old steel car axles.....	15.00 to 15.50
No. 1 railroad wrought.....	13.25 to 13.75
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.75 to 11.25
Light iron.....	5.00 to 5.25
Cast borings.....	7.00 to 7.25
Wrought turnings.....	8.25 to 8.50
Wrought pipe.....	10.00 to 10.25
Old car wheels.....	13.00 to 13.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.25 to 8.50
Locomotive grate bars.....	8.75 to 9.25
Malleable cast.....	10.00 to 10.50

Ferroalloys.—There is an easier market for 80 per cent. ferromanganese and the premium for spot is practically no longer asked. The price quoted is \$48.50, Baltimore. In 50 per cent. ferrosilicon there has been little change, the price asked for carload lots continuing at \$72.50, Pittsburgh, and lower for larger lots. There is no great activity in ferrosilicon.

Metal Market

NEW YORK, July 3, 1912.

The Week's Prices

		Cents Per Pound for Early Delivery.					
Copper, New York.		Lead		Spelter			
June.	Lake.	Electro-lytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
27.....	17.75	17.62½	47.50	4.50	4.37½	7.10	6.95
28.....	17.75	17.62½	47.00	4.50	4.37½	7.10	6.95
29.....	17.75	17.62½	.....	4.50	4.37½	7.10	6.95
July.							
1.....	17.75	17.62½	47.00	4.50	4.40	7.10	6.95
2.....	17.75	17.62½	46.50	4.50	4.40	7.15	7.00
3.....	17.75	17.62½	46.00	4.50	4.40	7.15	7.00

Copper is quiet, with producers and selling agencies holding their prices. Tin is easier and prices are lower, but there is little trading. Lead is dull and firm. Spelter is higher and very strong. Antimony is dull.

New York

Copper.—The copper market has continued very strong throughout the last week and producers and selling agencies have maintained their prices although there has been but little business. Inquiries indicate that consumers are well supplied, which to a large degree accounts for the lack of trading. There has been a little business in resale lots which are said to have gone at 17.50c. cash New York, but there have been few of these and they cannot be said to make the market. In the absence of active trading the prices to which the larger interests are adhering are practically nominal. Producers do not seem inclined to press sales, and there is in many directions an inclination to await the figures of the Copper Producers' Association for the month of June. The expectation is that further reductions in stocks will be shown which will undoubtedly still further strengthen prices. The exports of copper in June totaled the excellent figure of 26,547 tons. The speculative movement in standard copper abroad has so far had little or no effect on the metal in America, though it is conceded that continued activity must finally influence American prices and conditions. The strike trouble at the works of the National Conduit & Cable Company at Hastings, N. Y., was ended June 29 after two weeks' duration, so restoring a large consumer to activity again. The price of copper from first hands in New York is 17.62½c., cash, for electrolytic and 17.75c. for Lake. The London price to-day is £76 12s. 16d. and of futures, £77 10s. The exports so far this month have been but 25 tons.

Copper Averages.—The Waterbury average for the month of June was 17.50c. The average New York price of Lake copper for June, based on *The Iron Age* quotations, was 17.53½c. for Lake copper and 17.40½c. for electrolytic.

Pig Tin.—The week has seen a very quiet market in tin. With the prospect of substantial arrivals of the metal in the first few days of July, which will relieve the stringency in supplies, there has developed a tendency to wait for the decline which, in fact, already has begun. The Pottsdam from Rotterdam is in port to-day with 1019 tons of tin, and other vessels are bringing smaller amounts. In the last few days only those who urgently needed tin appeared in the market and there

were not many of these. An interesting feature of the tin situation is that despite the extreme shortage of recent date statistics show that on July 1 there was 1263 tons in stock here. In June the visible supply fell off 1425 tons. Deliveries into consumption amounted to 2850 tons in June. The price in New York to-day is 46c., as against 48.50c. June 20. The price of tin in London to-day is slightly weaker at £205 for spot and £200 15s. for futures. The arrivals this month have been 1750 tons and there is afloat 1635 tons.

Tin Plates.—The tin plate situation is unchanged in the New York market, the price of lowest sellers continuing at \$3.64 for 100 lb. coke plates.

Lead.—The lead market has been dull and quiet in the last week, although the St. Louis prices of the independent interests strengthened on June 1. The prices of the American Smelting & Refining Company are unchanged at 4.50c., New York, and 4.42½c., St. Louis.

Spelter.—The price of spelter has advanced and to-day is strong at 7c., St. Louis, and 7.10c. to 7.15c., New York. The demand from the galvanizers is heavy, and it is said that such is the scarcity that one producer shipped brass spelter on a contract that called for prime Western. It appears that consumers, hoping for lower prices, have held off until they are in a position where they now must buy. Of course the high price of ore has been talked of for some time. The Waterbury average of prices paid for brass mill spelter in June was 7.25c.

Antimony.—Antimony has been dull, with two changes. For Chinese and Hungarian grades 7.37½c. is asked, an advance of 12½ points. Cookson's is 12½ points lower at 8c., and Hallett's is unchanged at 7.75c.

Old Metals.—Quiet conditions continue. Dealers' selling quotations remain nominally as follows:

	Cents per lb.
Copper, heavy and crucible	16.25 to 16.50
Copper, heavy and wire	16.00 to 16.25
Copper, light and bottoms	14.50 to 14.75
Brass, heavy	9.75 to 10.00
Brass, light	8.25 to 8.50
Heavy machine composition	13.25 to 13.50
Clean brass turnings	9.75 to 10.00
Composition turnings	12.00 to 12.50
Lead, heavy	4.00
Lead, tea	3.75
Zinc, scrap	5.50

St. Louis

JULY 1.—The market has been uneventful, but business has been reasonably good. Lead to-day is quotable at 4.42½c. and spelter at 6.95c. to 7c., with both metals firm. Tin is a little irregular at 46.85c. to 48.35c. Lake copper is quotable at 17.97½c. to 18.10c., and electrolytic at 17.85c. to 17.97½c. Antimony, Cookson's, remains unchanged at 8.35c. In the Joplin ore market the past week the range on zinc blende, 60 per cent. basis, was \$53 to \$58 per ton, with choice lots bringing as high as \$61. The shipments are practically normal now. The price of calamine is from \$28 to \$30 on a 40 per cent. basis, with choice lots bringing as high as \$35. Lead ore shows a wide range, running from \$55 to \$58. On miscellaneous scrap we quote as follows: Light brass, 5.50c.; heavy brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; pewter, 21c.; tin foil, 31c.; zinc, 3.50c.; lead, 3.50c.; tea lead, 3c.

Chicago

JULY 2.—The past week has witnessed some attempted manipulation of the metal market, particularly with respect to copper. While there has been no change in the position of the domestic producers of this metal London fluctuations indicate a pressure to check further advances in price. The tin situation has been somewhat relieved by shipments routed to avoid the difficulties in Great Britain and prices are quotably lower. Other metals show no change in value. We quote as follows: Casting copper, 17.50c.; Lake, 17.75c. to 17.87½c., in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 48.50c.; small lots, 50.50c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.40c. to 4.45c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7c. to 7.05c. Cookson's antimony, 8.50c., and other grades, 8c., in small lots; sheet zinc is \$8.65 f.o.b. La Salle or Peru, Ill., less 8 per cent. discount, in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14.75c.; copper bottoms, 12.75c.; copper clips, 14c.; red brass, 12c.; yellow brass, 9.75c.; lead pipe, 4c.; zinc, 4.75c.; pewter, No. 1, 28.50c.; tin foil, 33c.; block tin pipe, 44c.

The existence of the Tariff Board came to an official end with the close of the Government fiscal year by lapse of the appropriation which supported it.

Iron and Industrial Stocks

NEW YORK, July 3, 1912.

The past week has been characterized by a general upward movement in the values of securities. Business conditions are so satisfactory and the prospects are so bright that political happenings appear to be disregarded. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	½	Pressed Steel, com..	35¾-36¼
Bald. Loco., com... 56 - 60½		Pressed Steel, pref..	101 - 101½
Bald. Loco., pref... 104½-105		Railway Spring, com.	35¾- 36¾
Beth. Steel, com.... 37½- 38½		Railway Spring, pref.	101 - 101½
Beth. Steel, pref.... 70 - 72½		Republic, com.....	24½- 28¾
Can, com..... 33¼- 36¾		Republic, pref.....	80 - 86¼
Can, pref..... 116 - 117½		Sloss, com..... 54¾- 58	
Car & Fdry., com.. 58¾- 59¾		Sloss, pref..... 100	
Car & Fdry., pref.. 118¼-118¾		Pipe, com..... 19 - 20½	
Steel Foundries..... 35 - 36		Pipe, pref..... 59 - 59½	
Colorado Fuel..... 31¼- 32¼		U. S. Steel, com... 69¾- 72¾	
General Electric... 172½-181¾		U. S. Steel, pref... 110½-112¼	
Gr. N. Ore Cert... 41¾- 43¾		Westinghouse Elec..	73 - 77½
Int. Harv., com... 118¾-122		Am. Ship, com..... 48 - 50½	
Int. Harv., pref..... 120		Am. Ship, pref..... 101¼	
Int. Pump, com.... 26¾- 28		Chic. Pneu. Tool..... 50	
Int. Pump, pref.... 80 - 81		Cambria Steel..... 43¼- 44¼	
Lackawanna Steel	33	Lake Sup. Corp.... 32½- 33¾	
Locomotive, com... 42 - 44¾		Pa. Steel, pref..... 99	
Locomotive, pref... 109¾-110		Warwick	10
Nat. En. & St., com. 16 - 16¾		Crucible Steel, com..	14¼- 15¾
Nat. En. & St., pref..... 93		Crucible Steel, pref..	89½- 92½
Pittsburgh St., pref..... 101¾			

Dividends Declared

The Chicago Pneumatic Tool Company, regular quarterly, 1 per cent., payable July 25.

The E. W. Bliss Company, regular quarterly, 2 per cent. on the preferred stock, payable July 1.

The Vulcan Detinning Company, regular quarterly, 1¼ per cent. on the preferred stock, payable July 20.

The General Fireproofing Company, Youngstown, Ohio, regular quarterly, 1¼ per cent. on the preferred stock, payable July 1.

The Pittsburgh Coal Company, quarterly, 1¼ per cent. on the preferred stock, payable July 25.

The National Fireproofing Company, Pittsburgh, quarterly, 1 per cent. on the preferred stock, payable July 15.

The Rhode Island Perkins Horseshoe Company, regular quarterly, 1 per cent. on the preferred stock, payable July 15.

Personal

Reuben Bowen, who has been connected with the International Steam Pump Company for over 15 years in the capacity of district and department sales manager, and also central sales manager of the Fred. M. Prescott Steam Pump Company, Milwaukee, Wis., and the Jeansville Iron Works Company, Hazleton, Pa., has resigned to accept the position of general sales manager of the Epping-Carpenter Company, Pittsburgh, Pa. The Epping-Carpenter Company is one of the oldest pump manufacturers in the United States, its organization dating back more than 60 years, but its new shops are most modern in every detail and the tool equipment is of the latest improved designs.

Capt. G. L. Carden, general manager of the Allied Machinery Company of America, returned to New York July 2 after an absence of about one year abroad. He will be here several months.

Paul Messer, engineer of the Yokohama office of the American Trading Company, 25 Broad street, New York, is now in this country to confer with the officials of his company.

George G. Moody, assistant to the president of Joseph T. Ryerson & Son, Chicago, has returned from a four weeks' trip to the Pacific coast.

S. F. Bowser, president of S. F. Bowser & Co., Fort Wayne, Ind., makers of oil circulating and storage systems, recently sailed for Europe to be away until September. The trip will be one of combined business and pleasure.

Frederic Allart, of the sales staff of the New York office of the Lukens Iron & Steel Company, sails for Southampton, England, on the Olympic, July 6.

S. H. Brownlee, for the past seven years purchasing agent of the Ontario Power Company, Niagara Falls, and allied interests, has resigned to take an important position with the Cedar Rapids Mfg. & Power Company, Montreal, which is starting an extensive hydroelectric power development on the St. Lawrence River.

F. H. Stevens, of Buffalo, N. Y., a member of the executive committee of the American Locomotive Company, was elected a director of the United States Cast Iron Pipe & Foundry Company at its annual meeting in Jersey City June 26. He succeeds John A. Hayes. Other directors were re-elected.

Harry E. Kies of Erie, Pa., has been appointed general superintendent of the Michigan Malleable Iron Company, Detroit, Mich.

Joseph T. Somers, recently with the Lackawanna Steel Company, Buffalo, N. Y., has been appointed Eastern representative of the Columbia Steel & Shafting Company, Pittsburgh, maker of turned and polished shafting, cold drawn screw stock and special shapes, and will have his headquarters in Philadelphia.

Gilbert H. Pearsall has been made vice-president of the Jacobs-Shupert U. S. Firebox Company, and will be in charge of its Eastern sales office, with headquarters at 30 Church street, room 732, New York. He will retain his position as secretary of Joseph T. Ryerson & Son, with whom he has been identified since May, 1901, being in general charge of sales since January 1, 1905. Prior to this connection, he held positions in the traffic and transportation departments of several railroad companies.

Charles Brearley Moore has resigned as vice-president of the American Arch Company, effective July 1, and has been elected vice-president of the Jacobs-Shupert U. S. Firebox Company. He will be in charge of its Western sales department, with offices in the Railway Exchange Building, Chicago. He has had wide experience in railroad equipment lines and has invented and developed a number of locomotive devices, the best known of which are his locomotive brick arches, of which a great many are in general use.

Fred A. Geier, president Cincinnati Milling Machine Company, Oakley, Ohio, left last week on a vacation trip to his summer home in Maine.

John McHaffee, secretary of the Puget Sound and Queen City Boiler Works, Seattle, Wash., started June 27 on a three months' trip to Ireland, where he will visit his parents, who reside at Belfast.

Robert H. Lasch, for many years partner in the firm of Selig, Sonnenthal & Co., and chairman and managing director of the Selson Engineering Company, Ltd., London, England, has resigned and severed his connection with the company. He can be addressed for the present at 8 Lancaster place, London, N. W. Henry M. Sonnenthal has been appointed as his successor and John M. Kadisch and Arthur Lord have joined the board of directors; the business continuing as heretofore.

Prof. H. M. Howe sailed for Europe Tuesday, July 2.

Frederick W. Cohen, engineer of erection in the bridge and construction department of the Pennsylvania Steel Company at Steelton, Pa., has resigned and on July 15 will become connected with the Goldschmidt Thermit Company, New York, as engineer and works manager.

Dr. Leonard A. Levy, head of the chemistry and research department of Alexander Wright & Co., Ltd., London, Eng., of which firm the Precision Instrument Company, Detroit, Mich., is the American manufacturing branch, has just been awarded the degree of doctor of science by the University of London.

Frank M. Eaton, resident partner of Hickman, Williams & Co., Cincinnati, Ohio, left this week on a summer vacation trip to the Rocky Mountains.

Dr. F. Schniewind, United Coke & Gas Company, 17 Battery place, New York, returns next week from a European trip.

Daniel G. Reid, a director of the United States Steel Corporation, sails for Europe next week.

Chairman E. H. Gary of the United States Steel Corporation, sailed for Europe on the Mauretania July 2.

W. J. Mead, general manager of the Olds Motor Works, Lansing, Mich., has resigned to accept a similar position with the Amplex Motor Car Company, Mishawaka, Ind.

C. H. Domhoff of the Domhoff & Joyce Company, pig iron merchant, Cincinnati, has left for a summer vacation trip to Bemus Point, N. Y.

A. S. Blagden has resigned as manager of the Thurlow, Pa., works of the American Steel Foundries to become

vice-president of the American Malleables Company, Buffalo and Lancaster, N. Y. His successor at Thurlow is John I. Reid, who has been assistant works manager.

Obituary

Floris Osmond

A cablegram received in the past week by Prof. Henry M. Howe announced the death at St. Petersburg of Floris Osmond, the eminent French metallurgist. M. Osmond was born in Paris, March 10, 1849. He graduated from the Ecole Centrale des Arts et Manufactures, where he studied metallurgy under the late Professor Jordan. After a few months spent in the machine shops of Fives-Lille, M. Osmond entered the employ of the Blast Furnaces, Forges & Rolling Mills Company of Denain and Anzin, and in 1880 he joined the metallurgical staff of the famous Creusot works. There he met M. Werth, with whose collaboration he wrote his first contribution on the application of the microscope to the study of iron and steel. In 1884 he left the manufacturing line to devote himself exclusively to the study of scientific metallurgy. It was in his private laboratory in Paris that he conducted the brilliant researches which have made his name famous on two continents. In 1888 the French Society for the Encouragement of National Industry awarded to M. Osmond a prize of 3000 francs and in 1895 a second prize of 2000 francs. In 1897 he received the Lavoisier medal in recognition of his masterly presentation and successful defense of the allotropic theory of iron.

M. Osmond's written contributions to the advancement of metallurgy number more than 75, many of these being exhaustive papers presented to the leading engineering societies. For the Iron and Steel Institute his more noteworthy papers were on "Critical Points of Iron and Steel," 1890; "Micro Structure of Steel," 1891; and "Howe's Researches on the Hardening of Steel," 1896. For the joint meeting of the American Institute of Mining Engineers and the Iron and Steel Institute at London in 1906 he and G. Cartaud prepared a joint paper on the "Crystallography of Iron." His contributions to the discussions of papers before the Iron and Steel Institute were voluminous and took a wide range. The subjects include alloys of iron and nickel, changes in iron produced by thermal treatment, cooling curves, electrical resistance of iron and steel, micro-structure of steel, current theories of hardening, aluminum steel, thermal treatment of iron and steel and influence of temperature on steel.

Some of M. Osmond's most admirable researches were those dealing with carbon conditions in steel and critical points in heating and cooling. In recognition of his important contributions to the literature of micro-structure it has been proposed to use the name Osmondite for the structures in steel representing the intermediate stages between martensite and pearlite and for those found in hardened steels which have been tempered, and to omit the names sorbite and troosite, previously used for these transition products. M. Osmond was awarded the Bessemer medal by the Council of the Iron and Steel Institute in 1906.

EDWARD A. SKAE, Detroit, Mich., president of the Gemmer Mfg. Company, maker of steering gears, aged 43 years, was instantly killed June 27 in an automobile accident. He had been at the head of the company for five years and was also prominently identified with other manufacturing and financial interests.

The Suspension Roller Bearing Company, Sandusky, Ohio, will erect a new building 60 x 340 ft. Its output will be anti-friction bearings for all purposes, shaft hangers complete, trolley wheels and hasps.

H. B. Barnard & Sons, metals, have removed their city offices from 59-60 Gracechurch street, to 148½ Fenchurch street, E. C., London, England. Letters, etc., for Glyn street, Lambeth, and for Guildhall Buildings, Birmingham, are to be addressed as heretofore.

The Lumen Bearing Company, brass founder, Buffalo, N. Y., is adding 1800 sq. ft. to its plant to take care of aluminum casting work. The company reports a very favorable year up to this time, orders running in excess of those received in the past.

Pittsburgh and Vicinity Business Notes

At a conference held in Pittsburgh last week between representatives of the Republic Iron & Steel Company and the Amalgamated Association of Iron, Steel and Tin Workers, the same increased wage scale for puddling and finishing was adopted as had been previously accepted by the Western Bar Iron Association at the conference in Buffalo, N. Y.

At a conference also held in Pittsburgh last week between the United Sons of Vulcan, composed of puddlers and bar iron makers in the Central West that sign the scale, an agreement was reached, and the new puddling scale of that organization for the year beginning July 1 will be based on a flat rate of \$6 per ton. Muck rolling will be one-eighth the straight price of boiling, and the figures will not be affected in any way by variations in prices of bar iron, which is the case with the Amalgamated scale.

Manufacturers who sign the puddling scale of the United Sons of Vulcan are as follows: Brown & Co., Inc., Wayne Iron & Steel Works, Pittsburgh; Lockhart Iron & Steel Company, Pittsburgh; Zug Iron & Steel Company, Pittsburgh; Pittsburgh Forge & Iron Company, Pittsburgh; A. M. Byers & Co., for two plants at Girard, Ohio, and one at Pittsburgh; Kittanning Iron & Steel Mfg. Company, Kittanning, Pa.; Colonial Steel Company, Colona, Pa.; Wilkes Rolling Mill Company, Sharon, Pa.; Wheeling Steel & Iron Company, Wheeling, W. Va.; Youngstown Sheet & Tube Company, Youngstown, Ohio.

A committee appointed by the industrial interests of the Pittsburgh district is arranging to entertain the members of the sixth triennial congress of the International Association for Testing Materials. The congress will meet in New York September 3, and continue in session until September 8. Following the closing of the meeting about 200 of those present will be taken on a visit to Washington, Buffalo and Pittsburgh. It is expected that they will be in Pittsburgh for two days.

The new sheet mill plant of the Reeves Mfg. Company, at Canal Dover, Ohio, having six hot mills, is now in operation. It was built to supply the company with sheets for its forming and other finishing departments. It also has two galvanizing pots and a roofing department, and makes everything in sheet metal building material as well as a line of specialties. The plant also has 12 charcoal knobbling furnaces and bar and skelp mills, making a specialty of charcoal iron skelp for locomotive boiler tubes as well as blooms and sheet and tin bars. H. C. Greer is president; James Rees, vice-president, and A. J. Krantz, secretary and treasurer.

The Brownell Company, Dayton, Ohio, manufacturer of engines, boilers, feed water heaters, tanks, etc., has opened a district office at 1418 Oliver Building, Pittsburgh, in charge of B. S. Rederer.

Frank B. Pope, Arrott Building, Pittsburgh, has been appointed representative in that city for the Mt. Union Refractories Company, Mt. Union, Pa., which has a capacity for making 40,000 silica and 4000 magnesite brick per day.

The Garland Corporation of Pittsburgh will, on July 1, retire \$50,000 first secured mortgage 6 per cent. sinking fund gold bonds.

New Steel Casting Plant.—The S. Jarvis Adams Company, Pittsburgh, identified with the iron foundry business as manufacturer of certain specialties for some years, has broadened its field by the building of a 20-ton open hearth steel furnace, the first heat having been made on Thursday, June 27. The steel department is in addition to the new modern iron foundry which this company built at Midland, Pa., five years ago. Some changes have recently been made in the officers of the company, who are now as follows: J. Ramsey Speer, president; Joseph McK. Speer, vice-president; Charles McKnight, treasurer; Clyde Brooks, secretary; F. B. Foster, manager of sales; W. L. Forster, general superintendent. The general offices are in 602 German National Bank Building, Pittsburgh.

The Variety Iron & Steel Works Company, Cleveland, Ohio, has taken a contract for the steel work for a new blast furnace to be built by the Woodward Iron Company, Woodward, Ala.

Customs Decisions

Steel Shafts

The Board of United States General Appraisers has overruled a protest filed by Thomas Prosser & Son in regard to an importation of the finished steel shafts which were assessed for duty at 45 per cent. under paragraph 193 of the tariff act of 1897 or at the same rate under paragraph 199 of the tariff act of 1909. It was claimed that these shafts were entitled to entry at the applicable rate according to value per pound as "mill shafting." The finished shafts are either parts of a particular kind of ball mill for cement grinding, or of roughing or rolling mills. In either case the shafts are integral parts of machines rather than shafting for transmission of power from prime movers to machines, and following a previous ruling of the board the collector's assessments stand.

Draw Plates

Regarding the importation of certain steel draw plates, the Washburn Wire Company claimed that the assessment of 45 per cent. was erroneous and that they were properly dutiable as "steel plates." The decision of the United States Court of Customs Appeals in a previous case is decisive of the issue, merchandise of this kind being dutiable as "forgings" rather than as "plates." As the protest does not raise the issue as to "forgings of steel" the decision of the collector stands.

Machinery Parts

In the protest filed by P. H. Petry & Co., the collector of this port had classified certain articles of iron at 45 per cent. duty and they were claimed dutiable at 1 cent a pound as "advanced forms of castings of iron." One of the items which the importers claimed called for "six hard cast rollers with shafts, partly machined." As the roller and shaft are permanently fitted to one another, the board holds that a combined article of this description partakes of the character of machinery rather than that of a mere casting of iron and in this respect the protest is overruled. In regard to the cast iron frames the protest is sustained and reliquidation will follow.

The Stilz Fuel Oil Burner.—Experiences with the Stilz fuel-oil burner are reported by H. B. Stilz of the Stilz Company, 1938 N. Marvine Street, Philadelphia. The burner uses air at relatively low pressure, from a blower and the air in passage through the burner is forced through a screw-like or helical passage which gives the air a vortical motion on issuing from an annular orifice in the center of which is delivered the oil jet. The burner is placed close to the opening through which the oil is atomized, and the action of the ingoing blast is calculated to induce an airflow around the burner in the usual way. Mr. Stilz states that at the Moore Jones Brass Company, St. Louis, a 600-lb. melt was obtained with about 25 cents' worth of oil burned. One of the Stilz burners is used at the Hess Steel Castings Company at Bridgeton, N. J., where, it is stated, nearly pure wrought iron is melted in crucibles requiring high temperature.

Profit sharing in Great Britain has recently been studied from statistics collected in the United Kingdom. It appears that up to June 30, 1911, a total of 232 schemes has been started by different firms, but at that date only 76 were known to be still in operation. In the four years ending with 1892 as many as 84 of these were inaugurated and only 16 survived. Later experiments seem to have proved more successful, the whole of the 16 begun in 1908 and 11 of the 13 launched in 1909 being still in existence. Of the 153 schemes, 40 were abandoned owing to the dissatisfaction of the employer with the results, 21 on account of losses or want of success, 21 because of liquidation, 17 on account of changes in or a transfer of business, and 10 owing to the apathy of the employees.

Electric tractor engines are used in Altona on the Elbe, Germany, for helping horse-drawn vehicles up a long and steep hill. The tractors are of about 40 h. p. capacity and take current from an overhead electric line. The loads handled range up to 7 tons.

The Machinery Markets

With but little variation there continue to come from all sections of the country satisfactory reports of business in the machinery trade. In several centers activity has materially improved in the face of political conditions that would have been disastrous a few years ago, and the situation is the cause of a great deal of satisfaction. New York's trade throughout June continued steadily good. In New England there has been little change and the demand for special automatic machinery continues heavy, while cotton machinery is also contributing to the activity. Baltimore has been dull for the last half month, which probably results from its being a convention city. There are several deals under way in Philadelphia, although buying this last week has been of a desultory kind. Unusual activity in the demand for tools in lots of one or two has existed in Cleveland, and at the same time there have been inquiries which represent fairly large figures, and the outlook is promising. In Cincinnati there have been somewhat similar conditions, with the addition of good export inquiries, and business generally is regarded as very fair. In Detroit some dealers report June to be the best month of the year, the greater part of the demand having come from the automobile builders. Chicago's activity is well maintained and indications are that trade will continue good. Woodworking machinery is active in the Central South, and other lines are holding up well. While June was on the whole satisfactory, last week was rather dull in Birmingham. Texas, which reports a betterment in Mexico, has experienced unusually large sales. General conditions are somewhat improved on the Pacific coast, where a large amount of construction work is under way and repair work has created some demand for tools.

New York

NEW YORK, July 3, 1912.

June business was generally up to the expectations of the New York machinery trade and the month averaged well with the preceding month, though the volume of business done was not equal to that of April. The sentiment of sellers may be expressed with the remark of one who said: "We have no cause for complaint." Inquiries from many and various sources have continued plentiful. The General Electric Company, of Schenectady, has out a fair list of miscellaneous machine tools on which estimates have in some cases been submitted but against which no orders have been placed as yet. The International Type Setting Machine Company, of Brooklyn, whose plan is to increase its machinery equipment gradually and as needed, is again in the market. The Benton Valve Company, 140 Liberty street, which has a brass foundry at Bloomfield, N. J., is contemplating the erection of a shop equipped with the necessary tools to finish its product and which is to cost about \$10,000. There has been circulated a pamphlet giving the plan of organization of the Lewis Grease Cup Company, of Philadelphia, which contains a list of the equipment to be required by the company. The estimated cost of the equipment is \$15,000. The announcement says that the company is to be incorporated with a Pennsylvania charter and a capitalization of \$100,000.

The Patton Paint Company, Newark, N. J., has prepared plans for alterations to its factory building on the river front, foot of Chester avenue, which will cost \$2,000. A second story devoted to offices will be added and the factory will be equipped with a sprinkler fire protective system, steam heat and electric lighting.

The S. H. Peck Planing Mill at East Aurora, N. Y., was destroyed by fire June 26 with a loss of \$30,000 on building and machinery. The plant will be rebuilt at once.

George Spalt, 904 Broadway, Albany, N. Y., has let the contract for a factory addition 76x80 ft., two stories.

The Board of Supervisors of Oneida County has had plans prepared for a one-story power house 56x59 ft. to be built at the Oneida County Home on Floyd avenue, Rome, N. Y.

Charles Cunningham, 22 Union street, Lockport, N. Y., has organized a company which has taken over the old plant of the Merritt Mfg. Company on Market street, that city. A new water turbine will be installed in place of the old water wheel and the new company will sell the power generated. The item which appeared in the issue of *The Iron Age* of June 13 stating that the Merritt Mfg. Company would erect the factory and install the power plant is erroneous.

The Aetna Engineering & Contracting Company, Herkimer, N. Y., has received a contract for the construction of a sewage disposal plant to be built at Frankfort, N. Y., by the Board of Sewer Commissioners from plans of Vrooman & Perry, engineers, Canajoharie, N. Y.

The Consolidated Sales Book Company, Rochester,

N. Y., has been incorporated with a capital stock of \$135,000 by T. O'Connor, O. Bitter and L. H. Houck to manufacture sales books, checks, etc.

The Carborundum Company, Niagara Falls, N. Y., manufacturer of abrasive wheels and powders has awarded a contract for two large additions to be made to its plant at Buffalo avenue and Eighteenth street, to cost \$90,000. One of the buildings is to be used for kilns; the other as a puddle-room. With the additions completed the company will increase its working force to over 800 men.

The Niagara File Mfg. Company, Buffalo, N. Y., and the Frontier File Company have been consolidated and the united company will erect a large plant on Division street, North Tonawanda, plans for which have been completed.

The Buffalo & Lake Erie Traction Company, Marshall J. Dodge, secretary, Buffalo, has awarded a contract for the construction of two sub-stations.

The Frontier Tire & Rubber Company, Buffalo, has plans in preparation for an addition to be made to its plant at Niagara street, Delavan avenue and the New York Central Railroad.

The Stewart Motor Corporation, Buffalo, has secured the extensive factory premises at Superior and Randall streets, formerly occupied by the Niagara Machine & Tool Works, and will at once install complete machinery equipment for the manufacture of motor trucks and commercial vehicles.

The Lumen Bearing Company, Sycamore street and New York Central Railroad belt line, Buffalo, is building an addition to its aluminum castings department.

The Beaver Company, Buffalo, manufacturer of Beaver Board has broken ground for two large factory buildings, each one-story, 200 x 150 ft., concrete and brick to be added to its plant at Beaver road and the New York Central Railroad.

The Jones Iron Works, Buffalo, has completed plans for a two-story brick addition to its plant at The Terrace and Court street.

The Columbian Facing Mills Company, Buffalo, has been organized by Harry and Marc Heinsheimer to manufacture and sell foundry facings and everything in the foundry facings and foundry supply line. A manufacturing plant has been arranged for at Bailey avenue and the Pennsylvania Railroad and the necessary machinery and equipment will at once be installed.

William R. Wadsworth, president of the Water Commission, Geneseo, N. Y., has awarded a contract to Halloran Bros., Elmira, N. Y., for the construction of a distributing reservoir and auxiliary appurtenances and for the laying of cast iron water pipes to connect with existing reservoirs.

Plans for a sewage disposal plant to be built at Harrison, N. Y., have been prepared by Alexander Potter, consulting engineer, 116 Liberty street, New York City.

Catalogues Wanted.

The Prentice Brothers Department of the Reed-Prentice Machine Company, 667 Cambridge street, Worcester, Mass., request catalogues of recent date for their office files.

S. DIESCHER & SONS,

Mechanical and Civil Engineers,

PITTSBURGH, PA.

New England

BOSTON, MASS., July 2, 1912.

Very little change is observable in the market. The increased volume of business continues with builders of machinery. The demand for special automatic machinery is heavy. The manufacturers of cotton machinery are much busier than they have been, the improvement having set in before the increased activity in cotton manufacturing asserted itself.

The Bridgeport Screw Company, Bridgeport, Conn., is making preparations for the manufacture of a full line of machine screws up to and including $2\frac{3}{4}$ in., and special screw machine products. On the company's premises is the building formerly occupied by the Acme Oil Engine Company and this will be given up to the new department. The company already manufactures a full line of wood screws in its new factory building.

The Autoyre Company, Watertown, Conn., has purchased all the real estate, including the buildings, of the Baird Machine Company at Oakville, a suburb of Waterbury, Conn., and will occupy the premises for the manufacture of an extensive line of wire and sheet metal novelties, specializing on wire and sheet metal forms that can be manufactured automatically. Julius H. Cowles, Waterbury, is the president; Frederick M. Reasley, Cheshire, Conn., vice-president, and Raymond G. Stewart, Waterbury, secretary and treasurer. This property was occupied by the Baird Machine Company until its removal to the new plant at Bridgeport.

The United Foundry & Machine Company, Bridgeport, Conn., recently organized to manufacture brass, bronze and aluminum castings, has rented the old Eaton, Cole & Burnham plant in that city, and will occupy the premises temporarily, until the completion of the new works, now in process of construction at Stratford and Bruce avenues. The new building will be of the most modern design, with walls having the maximum of glass. It will be 100 x 171 ft., and will be divided longitudinally, being essentially two buildings in one. The purpose is to keep the aluminum foundry completely isolated from the brass and bronze departments, to insure against accident in mixtures. Even the cleaning departments will be distinct. Some machine tools will be required for the machine room, which will be 25 x 60 ft. William C. Buckelew, Bridgeport, is the president; Andrew Steen, New York, treasurer; Philip D. Beach, Bridgeport, secretary; the directors consisting of these officers, and George A. Helme, New York, and F. L. Buckelew, Jamesburg, N. J.

The Humphreysville Mfg. Company has been incorporated with a Connecticut charter and a paid-in capital of \$10,000 to take over the business of Norman Sperry, Seymour, Conn., which he has carried on under the same name as the corporation, manufacturing copper goods. Mr. Sperry remains as president, while H. T. Baldwin will be secretary, treasurer and general manager.

The Hoey Mfg. Company, Providence, R. I., has been incorporated with a capital stock of \$30,000, to manufacture textile finishing machinery, taking over a business which has been in existence for about two years. The incorporators are John J. Hoey, Providence, James F. McCluskey, Pontiac, R. I., and Walter E. Brierly, Warwick, R. I. The company's equipment has to be made under order, as it is special.

The Standard Company, Torrington, Conn., will erect a new factory building, 102 x 338 ft., one story, of mill construction.

The Locomobile Company, Bridgeport, Conn., will build an addition, 50 x 150 ft., one story, of brick, mill construction.

The Athol Machine Company, Athol, Mass., will erect a three story building, 60 x 142 ft., which will be used as a machine shop.

The Gray Pay-Station Company, Hartford, Conn., will not erect the new factory building immediately. The land has been purchased and plans prepared for a structure 50 x 200 ft. and four stories. The company will manufacture telephone pay stations.

The Bristol Brass Company, Bristol, Conn., manufacturer of sheet brass, wire, rod, brass castings, brazed tubing and German silver, will build an addition to its rolling mill, 90 x 100 ft. The necessary new rolling mill machinery has been purchased.

The Whitney, Mfg. Company, Worcester, Mass., manufacturer of paper goods, will build a new factory, 70 x 180 ft. Excepting for sprinklers and heating apparatus, little equipment will be purchased as the motors and shafting of the present factory will be used.

The Automatic Welding Machine Company, Bridgeport, Conn., has developed and is about to put on the market a line of machines for the manufacture automatically of a welded steel chain or other forms where the wire must be endless and lies in one plane. The machines will make chain of either the straight link or German twisted coil type, in sizes from small wire to $\frac{1}{2}$ in. wire.

The Specialty Mfg. Company, 23 Jefferson street, Waterbury, Conn., has been organized to manufacture metal goods and novelties. A. F. Schwartz is the manager. No new equipment will be required at present.

Philadelphia

PHILADELPHIA, PA., July 2, 1912.

Buying continues of a rather desultory character, purchases being confined generally to single tool lots, although both manufacturers and merchants have considerable business under negotiation, fair groups of tools being involved. Some builders of special tools are a trifle better engaged, but makers of the standard types of tools are still operating on a restricted basis. Inquiries for equipment from the railroads continue light, although some lists of tools desired for increased shop efficiency have been made up, but purchases or even inquiries have not yet been sanctioned by the higher railroad authorities. Industrial establishments generally are becoming more actively engaged and the machinery trade looks forward to an improvement in buying, as the demand on the present tool equipment becomes heavier and its efficiency in connection with competitive business grows lower in comparison with the modern equipment. A fair business is moving in boilers, engines and general power equipment, although negotiations are largely confined to equipment of the smaller capacities.

In second-hand machinery and tools the demand has not been particularly active; day-to-day sales of the better classes of modern machine tools are noted, but business generally still falls below normal. While there is little business in machine tools for export, the local locomotive builder reports orders for a fair lot of locomotives, which class of business has been comparatively light for some time. There is still an active demand for steel castings, the recent entering of contracts has filled up a number of plants in this district and prompt deliveries have hardened materially. Gray iron foundries are also somewhat better engaged.

The contract for additions to the plant of the Pennsylvania Flexible Metallic Tubing Company, reference to which was recently made, has, it is stated, been awarded to E. J. Kreitzburg.

A number of local contractors are estimating on a one-story addition, 70 x 95 ft., to the plant of the Pennsylvania Rivet Company, Eleventh, above Cambria street.

The Gregg Carriage Company has had plans prepared by Sauer & Hahn for an addition, 40 x 150 ft., to be built to its factory at 1930 Arch street. The building is to be of concrete and will be used for general manufacturing purposes. Some additional machinery will be required, but has not been definitely decided upon.

Plans are reported in progress for a three-story concrete factory building to be erected at Grenlock, N. J., for the Bateman Mfg. Company, manufacturer of agricultural implements.

E. G. Budd and L. I. Heintz, formerly connected with the Hale & Kilburn Company, of this city, have engaged in the general steel stamping business under the name of the E. G. Budd Mfg. Company, with offices in the North American Building. A two-story factory building, 100 x 200, located at Aramingo and Tioga streets, has been acquired and partly equipped for stamping automobile bodies and similar work.

Herman Loeb, Director of Supplies, room 312, City Hall, will receive proposals until July 8 for one automobile for use of the chief engineer of the fire department; one for the assistant engineer; five for the use of the district engineers and six runabouts for use of district engineers. He will also receive bids for a four-wheel tractor for a water tower and one motor-raised hook and ladder truck.

The Schutte & Koerting Company, Twelfth and Thompson streets, has purchased 14 acres of land at Cornwells, Pa., where it proposes building additions to its plant. In the near future the brass foundry department will be moved to the new location and later departments for the manufacture of its heavier lines of goods will also be transferred. Plans for the building

and equipment of the new brass foundry are now being considered.

The E. A. Wright Engraving Company, Eleventh and Chestnut streets, has purchased a plot of ground, 124 x 176 ft., at Broad and Chestnut streets, on which, it is stated, a large manufacturing plant will be erected, but details are not available at this time.

The American Manganese Bronze Company is taking bids on a steel frame addition, 50 x 120 ft., to its foundry plant. This will practically double its molding floor space, and it is now considering the purchase of additional foundry equipment, which will double its productive capacity.

The Baldwin Locomotive Works has received orders in the past week for 18 large locomotives for the Japanese Government, three for export to China and six to be shipped to Brazil. In reference to the building of the proposed plant at Chicago, Ill., an official of the company states "that plans for the necessary buildings have been drawn, but not definitely decided upon. The grading and foundation work is, however, going forward and some decision on the plans is expected in the near future. The matter of the equipment has not been seriously considered."

The Philadelphia Textile Machinery Company, which recently acquired some six acres of land at Sixth street and Tabor road, will shortly take bids for a machine shop, 225 x 275 ft., to be erected as the first installment of a new plant. Plans are by the Hennebique Construction Company. Day & Zimmerman are advisory engineers. Considerable new machinery will be required to equip the plant, but the advisory engineers state that it will be some time until the matter of equipment is taken under consideration.

Baltimore

BALTIMORE, Md., July 2, 1912.

Irregular conditions are noted in machinery and iron and steel working industrial plants in this district in the past month. In some lines of special machinery equipment business has been fair. While buying of tools of the standard types has been light, several moderate propositions are in sight and a better volume of business during the current month is anticipated. Several fair-size power equipment contracts have been recently closed and more business of that character is pending. Local boiler makers, however, have not entered much new business. Labor conditions, while not unsatisfactory, are somewhat unsettled, although no scarcity is reported by industrial establishments. There has been a very fair demand for contractors' equipment; machine shop supplies have also been moving in better volume. Little municipal work beyond sewer and paving contracts has been coming out. Several large contracts of the character named have been placed and bids for further work are being asked. Building work has been confined to the smaller propositions, although fabricating shops are fairly well engaged. A moderate volume of business in second-hand machinery equipment is moving, mostly in the smaller standard tools. Gray iron foundries are a trifle better engaged, although but few plants have reached normal productive rates.

The Baltimore Tube Company is rapidly getting its new plant in shape and will remove from its present plant by August 1. Some few metal-working machine tools will be added to its present equipment, although just what will be required has not yet been decided.

The American Furnace Company has filed articles in Dover, Del., increasing its capital stock from \$100,000 to \$200,000. John Bolgiano, F. H. Shattus and Samuel E. Pitz are named as incorporators.

The American Can Company is planning the erection of a two-story factory building on Luzerne avenue between Hudson and Boston streets. It is stated that electrically driven can-making machinery will be installed, although no definite information is available.

Miller & Graham, paint manufacturers, have had plans prepared for a five-story factory building to be erected on Frederick street, near Baltimore street. Plans provide for a building 64 x 166 ft., of heavy mill construction. Elevators, a power plant, as well as special machinery for paint manufacture, will be installed. It is expected that the contract for the erection of the building will be placed at an early date.

Builders are estimating on a 13-story office building to be known as the Garret Building to be built at South and German streets. Plans provide for a stone building; four high-speed elevators and a power plant are to be installed.

John B. Adt has booked orders for considerable special machinery for export, including tobacco-working machinery for Manila and special drying machines for Portugal. Shipments of tobacco-working machinery have been made for export to Ecuador. Several local installations of elevator equipment have been made and a fair volume of new business is being figured on. The various departments of the plant continue to operate at full capacity.

Bartlett, Hayward & Co. will erect a new machine shop at their plant at Ramsay, Scott and Clifford streets. The building will be of steel frame, 100 x 168 ft. One 15-ton and two smaller cranes, which have been purchased, will be installed. No extensive list of tools will be purchased, it being the concern's intention to locate in the new shop the equipment now used in its three separate machine shops, bringing all its machine shops into one central plant.

The Baltimore Mfg. Company will build two two-story additions, one 61 x 29 ft., the other 24 x 50 ft., to its plant at Monument and Constitution streets. The new buildings will be used for the manufacture of yeast, and in addition to special machinery, the present power equipment of the plant will be increased.

The Aumen Machinery Company has been appointed representative of the Kerney & Trecker Company, Milwaukee, Wis., for its line of Milwaukee milling machines in the Baltimore district. Considerable business has been closed during the past few weeks for refrigerating machinery, including equipment for the Jordan-Stabler Company, Rockersberger's Sons and the Maryland Tuberculosis Sanatorium at Sabillville. Metal-working machine tools have been in fair demand, as have also pumps, although wood-working machinery has been somewhat quiet.

Chicago

CHICAGO, ILL., July 2, 1912.

Despite the fact that very little of the pending railroad inquiry for machine tools was closed in the past week the volume of business resulting from miscellaneous inquiry was well maintained. The extent to which manufacturers throughout this territory are adding to their plants is responsible for a very general buying of equipment varying from one and two machines to several. The prospect seems to be for a material broadening of activity among manufacturers and the sales outlook should be one of considerable encouragement.

The Sawyer Biscuit Company, Chicago, has taken out permits for the erection of a five-story factory building of concrete construction to cost \$65,000.

The Carter White Lead Company, Chicago, has been issued a permit providing for the building of a three-story brick factory building to be erected at a cost of \$54,000.

The Illinois Watch Company, Springfield, Ill., will build an addition, 48 x 126 ft., to its factory at Ninth street and North Grand avenue, to cost approximately \$7,000.

The Swarm Mfg. Company, East Moline, Ill., incorporated with \$10,000 capital stock, will manufacture farm implements. Incorporators are Emery E. Swarm, Bernard Schneider and John F. Oltman.

The addition to the Plow & Wheel Company's metal department at LaSalle, Ill., will be approximately 22 x 184 ft.

The Globe Seamless Steel Tubes Company, Milwaukee, Wis., has increased its capital stock from \$650,000 to \$1,000,000, which will be used for the extension of the business.

The International Hoist Company, Antigo, Wis., has broken ground for the erection of buildings which will comprise its new plant, estimated to cost \$75,000. The company will manufacture cranes, hoists, gasoline engines, etc.

The Wausau Iron Works, Wausau, Wis., is building a one-story addition to its factory which will be used as a shop to manufacture tanks, boilers, structural steel, stacks, etc., the estimated cost of which is \$25,000. Several cranes will be purchased.

The Rundle Mfg. Company, Layton Park, Milwaukee, Wis., will erect an addition, 52 x 62 ft., three stories, and to cost about \$15,000. The structure will be used in the manufacture of brass products.

The White Cedar Company, Marinette, Wis., is erecting a new electric mill for the cutting of posts and poles.

The I. B. Rowell Mfg. Company, which recently decided to locate its plants at Waukesha, Wis., has pur-

chased seven acres of land on which a new plant will be erected shortly.

The Chicago & Northwestern Railway Company has announced its intention to build a new 60-stall roundhouse and machine shops at Green Bay, Wis., and steps have been taken to acquire a suitable site.

Palmer Bros., operating a foundry at Belle Plains, Iowa, are about to install new machinery equipment to handle the manufacture of an additional product.

The Pioneer Button Company is about to erect at Lyons, Iowa, a new button factory, the main building of which will be 40 x 50 x 100 ft. About 100 button-cutting machines will be installed.

The Viking Pump Company, Cedar Falls, Iowa, has completed its plans for the erection of a new and up-to-date factory building on East Fifth street. Adjoining the building, H. E. Olbush will erect a new foundry building, which will be equipped with machinery to turn out all kinds of castings.

The city of Logan, Iowa, has issued bonds to the amount of \$20,000 for the construction of a waterworks system.

The Minnesota Gas & Electric Company, Albert Lea, Minn., has purchased property in that city, on which it is the intention to erect a large generating plant.

The Olmstead Gas Traction Company will locate its factory in Great Falls, Mont. The building, which will be 50 x 200 ft., will be modernly equipped with traveling cranes for heavy lifting and will have all the latest devices in shop machinery.

The Producer Gas Power Company, Hutchinson, Kan., a recently organized company, will erect a manufacturing plant to cost approximately \$100,000. The company will manufacture a machine known as the Nordensson double-down-draft gas producer.

The Wayne Mfg. Company, St. Louis, Mo., will build an addition to its factory and will also erect a one-story dry kiln.

Detroit

DETROIT, MICH., July 2, 1912.

The volume of machinery sales for June was decidedly good and some dealers report it the best month of the year. The active demand for tools noted last week continues although no lists of large importance came out. A number of new concerns manufacturing automobile accessories have been recently formed and others attracted to the city on account of its importance as an automobile center and considerable equipment is expected to be required by these interests during the summer. Considerable attention was given the conventions of the American Society of Automobile Engineers and of the National District Heating Association which were in session here last week. Those in attendance were visitors at many of Detroit's large industrial plants. Considerable improvement is reported in the demand for boilers lately and the call for pumps is also more active. A good volume of business in electrical equipment is noted and some fairly large installations are in prospect. Foundry conditions continue satisfactory with both steel castings and gray iron plants well engaged. Building conditions are rather more quiet, little new work of importance being figured on at present.

The Michigan Steel Castings Company, Detroit, at present occupying leased quarters at 250 Guoin street, has awarded a contract to the Wisconsin Bridge & Iron Company for the erection of a two-story foundry building, 160 x 180 ft., of brick construction, at St. Aubin avenue and Atwater street. The building will cost \$30,000 and some new equipment will probably be figured on later.

The Capital Auto Lock Company, Detroit, has been incorporated with \$10,000 capital stock to manufacture automobile locks. The incorporators include Benjamin Noble, Arthur E. Schreiter and Walter E. Martin.

The Kelsey Wheel Company, Detroit, manufacturer of automobile wheels, is erecting additions to its plant which will about double its capacity. The new structures include a main building 180 x 360 ft., two stories, and two large dry kilns.

The Standard Brass Works, Detroit, has increased its capital stock from \$30,000 to \$75,000 to provide for the erection of a new plant.

The Universal Machine Company, Detroit, has been incorporated with a capital stock of \$100,000 to manufacture typesetting machines and do a general machine shop business. The incorporators are Arthur S. Baker, Harvey A. Hadder and Hial Mapes, all of Albion, Mich.

The American Injector Company, Detroit, manufac-

turer of lubricating devices, has increased its capital stock from \$20,000 to \$150,000.

The Murphy Iron Works, Detroit, Mich., will erect a new foundry 112 x 280 ft., which will be used in making castings for the Murphy automatic smokeless furnace. The usual foundry equipment will be installed.

The Price Bros. Brick Company, East Jordan, Mich., has been reorganized and incorporated under the name of the East Jordan Clay Products Company with a capital stock of \$25,000. The capacity of its plant will be increased by the addition of new machinery and a spur railroad track to its clay banks.

The Hayes-Ionia Company, Ionia, Mich., has awarded a contract to F. F. Bauhagel for the construction of a large addition to its machine shop and four new dry kilns and will install additional equipment. The company is a manufacturer of automobile accessories.

At a special election held June 24, the village of Royal Oak, Mich., voted in favor of bonding for \$38,000 for the construction of water works. Work will begin at once.

The Flint Body Company, Flint, Mich., maker of automobile bodies, has been adjudged bankrupt and Robert H. Cook of Flint has been named as receiver. The concern has a capital stock of \$50,000.

Fire destroyed the sawmill of the Norton Lumber Company at Ontonagon, Mich., June 25, causing a loss estimated at \$70,000. The mill will probably be rebuilt.

The Buss Mfg. Company, Pentwater, Mich., has been incorporated with \$25,000 capital stock. It will engage in the manufacture and sale of woodworking machinery.

The taxpayers of Morenci, Mich., have approved the expenditure of \$5,000 for water works improvements.

It is reported from Kalamazoo, Mich., that the Automobile Axle Company, recently organized, will build a factory to cost \$175,000.

The Eastern Michigan Edison Company is having plans prepared for an addition to its power plant at Trenton, Mich. The building will be 39 x 46 ft. of brick construction.

The Sheffield Motor Company, Three Rivers, Mich., is preparing to rebuild its plant which was recently destroyed by fire. The concern is a branch of the Fairbanks-Morse Company.

Cincinnati

CINCINNATI, OHIO, July 2, 1912.

A representative of a large New York exporting house visited this city last week, and is understood to have left several nice sized orders for different kinds of machine tools. However, there are indications that the export trade will be very quiet during the summer months. A number of machine tool builders state there is not much domestic business in sight, but they continue to receive orders for single tools, and considering the season and the political situation business in general may be considered fairly satisfactory.

Second-hand machinery continues in poor demand, and dealers in this class of machinery are disappointed in the Southern trade that generally furnishes some good business during the summer months. The foundries, including stove makers, are operating to about 60 per cent. of capacity, which has been about the average for the past three months.

Work has commenced on the foundations for the additions to the plant of the Warner Elevator Company, Cincinnati, recently mentioned. One building will be 40 x 280 ft. and the other 70 x 80 ft., both one story and of regular mill construction.

Shuler & Benninghofen, Hamilton, Ohio, have let contract for an addition to their woolen mill in Lindenwald that will be 40 x 125 ft., one story, and of brick and steel construction.

John Schlutz, 315 Donahue street, Mt. Auburn, Cincinnati, is in the market for a second-hand 16 or 18-in. lathe and a 6-hp. gas or gasoline engine.

The Alumalux Company, Sidney, Ohio, has been incorporated with \$5,000 capital stock to manufacture a metal solder and flux. J. L. W. Henney and Louis McCallister are named among the incorporators.

Plans will soon be ready for the large new factory to be erected in Oakley, a Cincinnati suburb, for the Cincinnati Ball Crank Company, recently mentioned. B. L. Baldwin & Co., Perin Building, Cincinnati, are architects and engineers in charge of the work.

The Brownell Company, Dayton, Ohio, has had plans prepared by B. L. Baldwin & Co., Cincinnati, for a large brick and steel addition to its boiler and engine plant at Dayton.

The Wheeling Traction Company, Wheeling, W. Va., is advertising for bids for the construction of a repair station and car shop, the estimated cost of which will be about \$100,000.

Ground has been broken for the addition to the plant of the Miami Cycle Mfg. Company, Middletown, Ohio, recently mentioned.

The Wildberg Box Company, Cincinnati, has acquired the old plant of the Acme Box Company, on Gest street, and as soon as it can be refitted will move from its present location on Court street.

The American Rail Chair Company, Findlay, Ohio, has been incorporated with \$50,000 capital stock to manufacture rail chairs and other track specialties. Charles J. Hosler is named among the incorporators. Nothing has yet been given out as to manufacturing arrangements.

The Philip Carey Mfg. Company, Cincinnati, has increased its preferred stock from \$1,000,000 to \$2,000,000 and it is rumored will make some additions to its plant at an early date.

The Rotospeed Company, Dayton, Ohio, is a new incorporation with \$150,000 capital stock to manufacture calculating machines. J. A. Oswald is one of the principal incorporators.

The Proctor & Gamble Company, Cincinnati, will erect a two-story steel and galvanized iron manufacturing plant on Spring Grove avenue at an approximate cost of \$4,000.

R. H. Benner & Co., Cincinnati, have received news of the partial destruction by fire of its large sawmill at Three Mile Creek, Ala. Considerable valuable machinery will have to be replaced and plans are already under way for rebuilding the plant. On account of its large stock of lumber at other points the company will not be inconvenienced in making deliveries.

Details are not yet available as to the plans of the Southern Sheet & Tin Plate Company, Ashland, Ky., recently incorporated with \$50,000 capital stock. The incorporators are E. J., J. W. and D. M. Job.

Cleveland

CLEVELAND, OHIO, July 2, 1912.

The local machine tool market continues to improve. The demand for second hand machinery was unusually active during the week, many orders for single tools and small lots being booked. In new machinery some single tool orders for large lathes and boring mills were taken and there was a fair demand for lots of small tools. The volume of new inquiry for machinery has improved considerably and dealers are figuring on more business than for some time. One new Ohio company that will build engines is in the market for about 20 standard machine tools. Reports from manufacturers in metal working lines generally indicate a good volume of business that is not being interfered with by political conditions. Many plants are being hampered by a scarcity of labor. Foundries are suffering from a scarcity of molders and there is complaint because good machinists are hard to secure.

The National Engine & Mfg. Company, Youngstown, Ohio, recently incorporated with a capital stock of \$25,000 will shortly establish a plant at Girard, Ohio, where it will manufacture rotary oil engines, steam rotary engines, steel railroad ties and rail joint splices. The company has taken over the plant of the Girard Foundry & Machine Company which will be equipped with the required machinery. It is in the market for about 20 standard machine tools, including boring mills, planers, shapers and drill presses. The officers are: President, H. R. Greenlee, formerly secretary and treasurer of the American Belting Company, Youngstown; vice-president and general manager, W. J. Sheldon; secretary and treasurer, Chas. F. McLaughlin of Pittsburgh. The company will shortly increase its capital stock to \$200,000.

The Baker Motor Vehicle Company, Cleveland, Ohio, has formed a new company called the Baker Motor Vehicle Company, Ltd., of Canada, and will build an additional plant at Toronto, Ont. The Canadian plant will be used for the manufacture of pleasure cars. It is stated that the erection of this plant will not be started for several months.

The Village of Paulding, Ohio, will sell \$30,000 in bonds, the proceeds of which will be used to improve and extend the municipal water works and electric lighting plant.

The W. M. Pattison Supply Company, Cleveland, Ohio, has purchased the plant of the Long Arm System Company, Cleveland, that formerly manufactured automobile engines, transmissions, axles, gears, etc. The purchase includes the site, buildings, power and factory

equipment. The equipment included in the purchase consists of 205 machine tools, 10 furnaces, 21 motors and a large assortment of small machines. The machinery will probably be offered for sale in lots to suit the purchaser.

The Zanesville Mfg. & Supply Company, Zanesville, Ohio, and the Shealey Foundry Company, Upper Sandusky, Ohio, have been consolidated into a new company under the name of the Buckeye Foundry & Mfg. Company. The new company will occupy the Shealey plant in Upper Sandusky which will be considerably enlarged in the future. The company will manufacture conveyor chains, pipe fittings and laundry machines. The new officers are: President, Charles F. Shealey, secretary and treasurer, W. H. Laner. In addition to the officers J. N. Barringer, George B. Kauffman and Richard Carter are directors.

The Schneider & Trenkamp Company, Cleveland, Ohio, manufacturer of stoves, has placed contract for the erection of a large storage warehouse. The building will be about 45 x 112 ft., four stories, of brick and mill construction.

The H. V. Hartz Company, Cleveland, manufacturer of special machinery, tackle blocks, etc., will move from its present location on Ashland avenue to more desirable quarters in one of the buildings owned by the Standard Foundry & Mfg. Company at East Seventy-fifth street and the Nickle-Plate tracks. The company will substitute motor drive for its present power equipment.

The Director of Public Service, Cleveland, will receive bids July 15 for a new refrigeration system for the new West Side market house.

The Rummel Machine Screw Company, Cleveland, has increased its capital stock from \$20,000 to \$30,000.

The Acetylene Stove Mfg. Company, Cleveland, Ohio, has been incorporated with a capital stock of \$20,000 to manufacture stoves. The incorporators are Carl F. Shuler, T. L. Hopkins, E. S. Barnard, E. L. Davis and Thomas Schmidt.

The Cleveland Brass Mfg. Company, Cleveland, has been incorporated with a capital stock of \$150,000 by M. F. Barnett, W. J. Smith and others.

The Wise Furnace Company, Akron, Ohio, has commenced the erection of a new foundry. The building will be 150 x 200 ft. of brick, steel and concrete construction. Later a machine shop will be built.

The Akron Gear & Engineering Company, Akron, Ohio, has been incorporated with a capital stock of \$20,000 by J. E. Tripplett, E. O. Prior and others.

The Cleveland Steel Barrel Company, Cleveland, Ohio, is the name of a new concern with a capital stock of \$10,000 that was formed to manufacture steel barrels, tanks, etc. The incorporators are C. T. Schriener, J. M. Finney, R. D. Morgan and others.

John M. Williams, Director of Public Service, Portsmouth, Ohio, will receive bids July 8 for machinery and other equipment for the extension of the water works system of that city. Plans are on file with Witner & Brown, engineers, Buffalo, N. Y.

W. H. Hyde, of Marietta, Ohio, and others have closed a deal for the purchase of the Athens Foundry & Machine Company, Athens, Ohio.

The Shop of Siebert, Toledo, Ohio, maker of the Siebert truck and automobile bodies, has commenced the erection of a three-story factory building 75 x 105 ft. of brick and concrete construction.

The Sterling Brass Company has placed in operation a new plant at Forty-seventh street and St. Clair avenue, Cleveland. The company will manufacture a staple line of plumbers' brass goods. I. Herzbrun is president and manager.

The Regar Company, Cleveland, maker of plumbers' brass goods, has changed its name to the Regar Brass Mfg. Company.

Indianapolis

INDIANAPOLIS, IND., July 2, 1912.

The Martin Tractor Company, Indianapolis, has been incorporated with \$350,000 capital stock to manufacture the Martin tractor. The company proposes to make 500 machines a year. The directors are Hugh R. Richards, F. B. Davenport, Edward D. Moon and George D. Thornton, Indianapolis, and Charles H. Martin, the patentee. The tractor is now being manufactured under a shop license by an automobile factory in Massachusetts.

The Butchers Packing Company, Indianapolis, is contemplating the erection of a factory at Ray and Dakota streets to cost \$100,000.

The Otis Motor Car Company, South Bend, Ind., has been incorporated with \$10,000 capital stock, to manufacture motor cars. The directors are: N. L. Otis, J. B. Beattie and Gilbert Squires.

The Petersburg Cooperage Company has bought a sawmill plant at Petersburg, Ind., and will equip it with barrel-making machinery. It has a plant at Columbus, Ind., which makes heading.

The Sibley Stove Company, South Bend, Ind., has been incorporated with \$30,000 capital stock to manufacture stoves. The directors are I. A. Sibley, H. L. Greene and N. C. Sprague.

The Pike County Electric Light & Power Company, Petersburg, Ind., has been incorporated as a public service corporation with \$15,000 capital stock. The directors are W. D. Hodson, W. T. McCoskey and W. F. Seager, all of Lansing, Mich.

I. W. Clark, who has a machine shop at Greentown, Ind., has made a proposition to the Commercial Club, of Tipton, Ind., to establish a foundry and general machine shop at Tipton.

The Standard Cart Mfg. Company, Cincinnati, Ohio, has leased buildings at Lawrenceburg, Ind., and will move its plant there. It manufactures road carts.

The Miko Machinery & Supply Company, Muncie, Ind., has been incorporated with a capital stock of \$1,000. Incorporators are Carl D. Fisher, J. M. Heron and J. B. Bannister.

The A. L. Greenberg Iron Company, of Terra Haute, Ind., has increased its capital stock \$60,000.

The Gary Semi-Steel & Foundry Company, Gary, Ind., has been organized with a capital stock of \$30,000 by Timothy Holland, W. A. Cain and O. S. McGinnity.

The Central South

LOUISVILLE, KY., July 2, 1912.

The second half of the year is opening rather auspiciously and business is holding up well. The number of inquiries for all classes of equipment, and especially for power machinery, is surprisingly large and the general run of trade is satisfactory. Although July and August are usually dull, there is reason to believe that conditions will be better than the average in the next two months. Wood-working machinery is an active item in this territory at present and electrical apparatus of all kinds seems to be moving rather briskly.

The firm of House & Fieldhouse, composed of James House and Fred Fieldhouse, which has established a machine shop at 132 North Fourth street, Louisville, will need no machine tools at present, as they have bought the business and equipment of McBride Bros.

The Louisville Railway Company, D. X. Murphy & Bro., architects, has let the contract for the structural iron work on its new power-house to the Louisville Bridge & Iron Company and has given the coal and ash bin construction work to the Henry Vogt Machine Company, Louisville. The latter consists of heavy plates and angles and involves about 600 tons of material. A considerable amount of conveying equipment will be installed in the bins.

The W. H. Gillette Company, Louisville, manufacturer of vehicle stock, will erect an addition to its plant to be used as a forging department. Equipment will be purchased during the summer, as it is intended to have the department in operation this fall.

The Modern Construction Company, recently organized in Louisville for the manufacture of tile, has given an order for the manufacture of special machinery to the Kentucky Gear & Machine Works, Louisville. The company may be addressed for the present in care of the machine works.

The American Automobile Mfg. Corporation, which recently purchased at a receiver's sale the property of the American Automobile Mfg. Company, New Albany, Ind., is to operate the plant, it is announced. Ferdinand Kahler is to be president and general manager of the company, having acquired a majority interest, in company with E. O. South, Cincinnati. Mr. Kahler is at the head of the Kahler Company, New Albany, manufacturer of automobile bodies.

The Crystal Ice Company, Newport, Ky., has given a contract to the York (Pa.) Mfg. Company for the installation of refrigerating machinery.

The Chess & Wymond Company, Louisville, is planning the installation of a large stave mill near Hyden, Ky.

The Kentucky State Board of Control of Charitable Institutions will receive bids until July 12 for one water-tube boiler and four down-draft smokeless furnaces or mechanical stokers to be installed at the Western State Hospital for the Insane, Hopkinsville, Ky. The office of the board is at Frankfort. D. X. Murphy & Bro., Louisville, are the architects.

A. C. Blowers, Pineville, Ky., is considering the

erection of a lime kiln and is asking for prices on equipment, including crushing and conveying machinery.

Taylorsville, Ky., has adopted an ordinance creating an electric light franchise and it will be sold in about 30 days. There will be two bidders, Henry & Henry and I. Beauchamp. Both are flour mill operators and will install electrical machinery in their mill plants in the event that they secure the privilege.

C. R. Payne, C. C. Baker and J. H. Baker are members of the concern which is installing an electric light plant at Burkesville, Ky. Most of the equipment has been contracted for. A crude oil engine will be used.

The city of Newport, Ky., is negotiating with several suburbs with the idea of building a garbage incinerator large enough to take care of their needs as well as those of the city. From \$20,000 to \$40,000 will be spent in the erection of the plant.

The Barret Manual Training High School, Henderson, Ky., is purchasing additional equipment. Ten forges have been contracted for and other machinery will be added later. J. Thomasson is in charge of the school.

The Dugan Radiator Company, Logansport, Ind., is reported to be planning the erection of a plant for the manufacture of pipe at Chattanooga, Tenn.

The Knoxville Welding Company, Knoxville, Tenn., which has been incorporated with \$5,000 capital stock, will install welding equipment, including an air compressor, in a shop which has been secured. Walter H. Finley and others are the incorporators.

Water power sites in eastern Tennessee will be developed by the Morristown Power & Development Company, Morristown, Tenn., in which John Loop, W. C. Hale and others are interested.

A manual training department is to be installed in the Washington High School, Paducah, Ky. An appropriation of \$3,500 for the purchase of equipment has been made. Address the clerk of the school board.

The F. & O. Cedar Works, Burnside, Ky., is planning the installation of machinery for the manufacture of pencils. T. H. Hewlett is manager of the company.

The J. W. Johnston Company, Quicksand, Ky., is preparing to erect a large band-mill for the manufacture of white oak lumber. The mill will have a capacity of 40,000 ft. a day. Quicksand is near Jackson, Ky.

The Currier Lumber Company, which has a large lumber plant at Glamorgan, Va., is planning to erect several mills near Whitesburg, Ky., just over the border.

The Consolidation Coal Company, Baltimore, Md., which is improving its industrial towns in eastern Kentucky, will build an ice factory at Jenkins.

J. T. Moore and John Gorman, coal operators of Knoxville, Tenn., have leased a large tract of coal land near Hazard, Ky., and will install power and mining machinery at a cost of \$75,000. They will provide for an annual output of 250,000 tons.

A large stave plant will be erected on a 14-acre site just purchased by the Chickasaw Cooperage Company, Memphis, Tenn.

Plans for an addition are being considered by the Memphis Coffin Company, Memphis, Tenn., which has increased its capital stock from \$50,000 to \$250,000.

Merrill B. Parker, Chattanooga, Tenn., is in the market for a small power plant consisting of a 50-kw. generator, several motors ranging in size from 5 to 20 hp. and a switchboard.

The Ruskin Cave College, Ruskin, Tenn., is in the market for a 35-kw. generator. A used machine would be preferred. R. I. Smith is president.

The announcement that the Tennessee Power Company would erect a hydroelectric plant on the Nolachucky River, near Greeneville, Tenn., having purchased the plant of the Greeneville Electric Company, was in error. The purchaser was the Tennessee Eastern Electric Company, which is financed by Warner, Tucker & Co., Boston, Mass. The same company has purchased the Watauga Electric Company and the Johnson City Traction Company, both of Johnson City, Tenn., and has applied for franchises in Morristown, Erwin, Jonesboro and other cities in that section, to which it plans to furnish current from its Nolachucky plant. W. V. N. Powelson, New York, is to provide plans for the plant and will be in charge of its construction. He will establish headquarters at Johnson City. The company plans to develop an interurban traction system in eastern Tennessee to be operated from its hydroelectric plant.

The Milne Chair Company, Greeneville, Tenn., has begun the erection of a factory in Chattanooga, Tenn. The cost of the plant will be over \$100,000.

The Ashton Roller Mills, Columbia, Tenn., is installing machinery for the development of electric cur-

rent from water power and will make arrangements to supply the utility companies of Columbia with current.

The Algiers Iron Works Company has been organized at New Orleans, La., by the election of Edgar Berthant, president, and Camille Berthant, secretary. The company is capitalized at \$10,000.

Birmingham

BIRMINGHAM, ALA., July 1, 1912.

Machinery and machine tool dealers report a dull week. June was altogether satisfactory, but it closed uneventfully and with little business doing in any line. The repair business has been good straight along and minor mill supplies such as belting have gone well. The sawmill trade continues to be fair with an inclination to pick up. General industrial conditions are excellent as the half-year turn is made and the general business prospect is good.

The Coosa River Electric Power Company, Birmingham, has plans for the construction of a hydroelectric plant at Lock No. 2 at Ten Islands Shoals on the Coosa River. It proposes to develop 25,000 hp. and the estimated cost of the plant is \$2,000,000. Roswell H. Cobb, of Gadsden, Ala., is president of the company.

The Union Oil & Fertilizer Company, Union Point, Ga., has been incorporated with \$50,000 capital stock and has acquired and will remodel and equip with new machinery the Green County Oil Company's mill. A. J. Gillen, Maxeys, Ga., Hamilton McWhorter, Jr., Hamilton, Ga., and others are the incorporators.

Redwine Bros. will erect a fertilizer plant at Fayetteville, Ga. Smith Bros. & Co., Birmingham, have started the erection of the flour mill of Lvnville Mill & Elevator Company at Decatur, Ala.

Cordele, Ga., has granted a franchise to J. B. McCrary & Co., Atlanta, Ga., for a gas plant. The proposed expenditure will be \$20,000 to \$50,000.

The Warthen Ginning & Milling Company, of Buena Vista, Ga., will erect plant to gin cotton and saw lumber. W. R. Warthen, J. T. Wall and others.

The Lakeland Ice & Refrigerating Company, Lakeland, Fla., will increase its capacity. It is reported at Tampa, Fla., that the Consumers Ice Company will establish a \$50,000 cold storage plant.

Kenner Cup & Gutter Company, Brunswick, Ga., has been incorporated for the manufacture of patented turpentine cups, gutters, etc. W. E. Kenner, E. H. Mason and others.

The Gulf Refining Company, Pittsburgh, Pa., has bought a site and will erect storage tanks at Pensacola, Fla.

Augusta, Ga., has voted \$100,000 of bonds for water works improvements.

P. J. Wood, Augusta, Ga., has a franchise to sell electric power at Spartanburg, S. C. The erection of an electric power plant is contemplated. Alabama Cotton Oil Company will install two 80-saw gins, etc.

The W. E. Foshee & Lovelace Lumber Company, Brewton, Ala., is reported as arranging for the establishment of a veneer factory at McDavid, Fla.

The Valdosta Buggy & Wagon Works, Valdosta, Ga., has been incorporated by James Chambers and others with a capital stock of \$2,000.

The Blood Mountain Lumber Company has been incorporated with a capital stock of \$500,000 by Charles F. Mebus and George C. Barber, Philadelphia, and Henry A. Patter, New York, with headquarters at Dahlonga, Ga.

Great Eastern Lumber Company, Savannah, Ga., will erect a large sawmill, planing plant and electric power plant on the Savannah River near Savannah, where it has acquired a 3400-acre tract.

Texas

AUSTIN, TEXAS, June 29, 1912.

The optimistic feeling over the prospects for good crops was probably never greater than now. So far there are no indications of any midsummer dullness in any of the regular lines of business and trade. Machinery dealers report that their sales are unusually large and they look for a continuation of the present satisfactory conditions. It is noticeable that the demand for machinery in Mexico is beginning to show an increase and it is expected that if tranquillity is restored in that country there will be unusual activity in the machinery trade there. In the Tampico district where extensive oil development is in progress American manufacturers and dealers are finding a good field for their operations in the sale of steel tankage, casing,

pipings, drilling outfits, including boilers and engines and various lines of tools and supplies that are required in oil operations.

The new municipal filtering plant will soon be finished at Brady. The city also has in course of construction a large dam which will impound water for the municipal supply.

The Farmers' Union Gin Company will erect a four-stand cotton gin at Sabinal.

The business men of Batesville are offering bonuses of \$500 cash to anyone who will install a cotton gin at that place.

A company represented by E. E. Savage, Rockport, has purchased the old electric light plant of that city which will be enlarged to include a foundry and machine shop to manufacture refrigerators and to furnish power for other factories. New machinery to the amount of \$40,000 will be installed as soon as the buildings are ready.

M. I. Flowers is installing a modern cotton gin at Waelder.

The Rio Grande Wax Company is installing machinery in its new candelilla wax factory at Alpine.

The Edin Gin Company is installing a cotton gin at Bryan. It will have a capacity of 100 bales per day.

The city of McAllen is installing a waterworks plant and laying a distributing system. The latter will consist of about five miles of mains.

The Temple Chamber of Commerce is considering the establishment at Temple of a large furniture factory. It is stated that about \$200,000 will be invested in the enterprise.

The Bermuda Land & Livestock Company will drill several artesian wells and establish a system of irrigation upon its land near Asherton.

J. C. Howeth is installing an electric lighting system at Oakwood.

McIlver & Randolph are developing an oil field at Beef Pen Prairie, about seven miles east of Normangee.

The W. P. Carmichael Construction Company, St. Louis, Mo., which has the contract for constructing the dam across the Colorado River at Austin, Texas, is installing complete machine shops near the dam site.

It is authoritatively announced that the Union Terminal Company, composed of all the railroads that enter Dallas, which was recently organized in that city, will not only erect a \$5,000,000 union passenger station, but will also install large shops, round house, electric power and light plant and extensive terminal facilities. F. G. Pettibone is president; Thronwell Fay and W. A. Webb, vice-presidents; Murrell L. Buckner, treasurer; R. P. Roach, W. C. Conner, J. W. Robbins, C. W. Jones, J. W. Everman and F. G. Pettibone, members of the executive committee. It is announced that the present plans of the company do not involve the construction of a belt line around the city. The site of the proposed union station has not yet been definitely determined.

Preparations are being made by the City Council for the construction of a sewer system at Bartlett.

The Mountcastle Irrigation Company was recently organized at Fort Worth with a capital stock of \$600,000. It will construct a large system of irrigation in western Texas. The incorporators are G. C. Mountcastle and R. I. Merrill of Fort Worth, S. Mayer of Denver, Joseph Rosenbaum, E. F. Rosenbaum, Edward S. Rosenbaum, Walter S. Rosenbaum, Frederick Uhlman and A. R. Frank of Chicago.

It is announced that the Magnolia Petroleum Company will enlarge its oil refining plant at Beaumont at a cost of between \$300,000 and \$500,000.

M. C. Cope of Abilene will establish a pressed-brick plant at Plainview. Modern machinery and equipment will be installed.

The City Council of Shamrock has taken steps to enlarge and improve the waterworks system there by erecting a 100,000-gal. steel tank, laying new mains in different parts of town, installing a pumping plant and erecting dam for the purpose of impounding water for municipal use.

Improved conditions in Chihuahua, Mexico, have enabled the Mexico Northern Power Company to resume on a large scale the construction of a dam across the Conchos River and the installation of a hydroelectric plant 18 miles from Santa Rosalia, Chihuahua. This enterprise involves the expenditure of about \$10,000,000 gold. During the height of the revolutionary troubles the construction work was so seriously interfered with that it had to be temporarily abandoned.

The Tampico Electric Light, Power & Traction Company which was recently organized in London, England, as a subsidiary of S. Pearson & Son, Ltd., has formally taken over the electric power and lighting plant at Tampico, of the Compagnia Fuerza Electrica

and the J. F. Vorde Company, also the street railway system, which is now operated by mules. The new company has a capital stock of \$10,000,000 gold. It is announced that it will expend approximately \$1,250,000 gold in extending the line of the street railway system to Labara, at the mouth of the Panuco River, six miles below Tampico, and the converting of the system into electric traction. The company will also install a new electric power plant of 3000 hp. at Tampico.

The Puebla Tramway & Power Company of Puebla, Mexico, has more than 1000 men employed in the erection of hydroelectric plants at the falls of the Rio Blanco at Tuxpango and at the falls of the Rio Atoyac, both in the state of Puebla. These two hydroelectric plants will generate a total of about 55,000 hp. Power transmission lines will be constructed from the two plants to all the principal cities and industrial centers of the states of Puebla and Vera Cruz.

The Pacific Coast

PORTLAND, ORE., June 25, 1912.

No machine tool orders of special importance have been placed recently, but some slight improvement is noted in single tool business, with a fair scattering of orders for two or three small tools. General conditions are gradually improving, the large amount of heavy construction under way giving rise to a large volume of repair work, while much of the machinery used in logging, etc., is manufactured in this territory. Most shops, however, are able to take care of more work than is offered at present, and it is doubtful whether any general demand for new tools will develop during the present year.

Lumber mills and woodworking plants in western Washington are operating on a much larger scale than a few months ago, and conditions in this line are more satisfactory than for several years. Most of the mills which will operate this summer have completed their equipment, and while some new inquiries are coming up it takes some time for the business to develop. Logging firms, however, are putting in considerable new equipment, and as they are working further back from established lines of transportation their requirements are increasing.

The general demand for contractors' machinery has improved materially, but is said to be much better beyond the Canadian line than in this vicinity. A large amount of equipment will be required for the electrification of the Southern Pacific lines in and around Portland, for which preparations are now being made, and there is a great deal of miscellaneous railroad work in the interior. Large deliveries of mining machinery are now being made to the Nome district. The steamer Leelanaw, leaving Seattle June 18, took five gold dredges, for the Seward peninsula, two of them built by the American Dredge Building & Construction Company of that city, and a stamp mill for Fairbanks from the Seattle Construction & Drydock Company. F. L. Wagner of Valdez, Alaska, has been in Seattle to purchase a stamp mill, and several other inquiries are coming out.

Two of the six sections of the Seattle Construction & Drydock Company's floating drydock have been put in place at the plant. This company has purchased the Pacific coast rights to manufacture the Gaertner lifeboat-releasing device, invented by a Seattle man. The company expects to bid on a steel steamer for the Matson Navigation Company, figures for which are being taken at San Francisco.

The Smith Cannery Machinery Company, Seattle, Wash., has let a contract for a new building which it will occupy on completion.

The Kent-Marvin Company, Bellingham, Wash., has increased its capital stock to \$50,000, and contemplates the installation of a large marine machinery depot and shipyard on the waterfront at that place.

The Multnomah Mohair Mill, St. Johns, Ore., is preparing to make a large addition to its plant.

The Idaho Portland Cement Company has made arrangements to put up a large plant at Asotin, Wash. The crusher plant is being erected by the Freeborn Engineering & Construction Company.

The Randolph Lumber Company, operating near Bandon, Ore., recently installed a lot of new machinery.

The Farmers' Warehouse Association, Asotin, Wash., is preparing to install a flour mill at that place.

The Willamette Iron & Steel Works, this city, has sold three of its large logging engines to Wilson Bros. & Co., Aberdeen, Wash., and two to the Pacific Lumber Company, Scotia, Cal.

Figures are being taken by the City Comptroller of

Seattle, Wash., for an air compressor and tank, rock drills, motors, hoists, an aerial tramway and derricks to be used at Cedar Falls, Wash.

The Northwest Ideal Package Company, recently incorporated in this city, proposes to equip a plant for the manufacture of paper bottles.

The Hoquiam Sash & Door Company, Hoquiam, Wash., has installed several new machines.

The Coast Range Lumber Company, Mabel, Ore., is putting in an electric monorail system.

Western Canada

WINNIPEG, MAN., June 27, 1912.

There is little change in the industrial situation in western Canada. The Winnipeg machinery houses report business active and conditions are apparently satisfactory in the cities west of Winnipeg. Building permits continue to increase rapidly on account of the number of large business and office blocks being erected. Hardly a week passes in which there are not one or two announcements of some eastern Canada or United States manufacturer getting ready to open branch factories in the West.

H. S. Grigg, president of the Grigg Mfg. Company, Minneapolis, Minn., is erecting a factory in Kildonan, a suburb of Winnipeg, for the manufacture of farm implements. Claydon Bros., contractors, are already working on the foundation. The plant will cost about \$100,000.

The Telautophone Company, Ltd., Winnipeg, has been incorporated with a capital stock of \$600,000 to manufacture telephone and telegraph apparatus and supplies. The manager is Roger P. Fournier.

Finance Commissioner Mantle of Regina, Sask., announces that a scheme is under way there to establish a municipal gas plant.

G. W. Chambers, Edmonton, Alberta, acting in behalf of eastern and local capitalists, is having plans prepared for a 10-story hotel in that city at a cost of about \$350,000. Van Sieten & Macomber, Edmonton, are the architects.

S. Hadley & Son, Chatham, are managers for a company organized by Calgary, Alberta, capitalists, to develop a rich coal area in Alberta. The company has a capital stock of \$1,000,000.

C. H. Forrester and Thomas Kelly, capitalists, Winnipeg, are preparing to erect a 16-story office building on property recently purchased by them on Portage avenue, this city.

It is announced that A. W. McIvor, proprietor of the Palmer House, Regina, Sask., is starting to build in that city one of the most elaborate hotels between Winnipeg and Vancouver.

A. S. Porter, Regina, Sask., representing capitalists who own 17,000 acres of land at Estevan, Sask., is forming a syndicate for the purpose of installing at the latter place a producer gas plant and briquette plant. It is proposed to erect a transmission line from there to the principal neighboring towns, over which electric power will be sent.

The Thresher Specialty Company, Ltd., Battleford, Sask., with a capital stock of \$150,000, will immediately start the construction of a factory.

The Canadian Pacific Railway Company has practically decided to erect large terminal elevators at Vancouver, B. C., in view of the grain traffic that way which will follow the opening of the Panama Canal.

J. H. G. Russell, architect, Winnipeg, is receiving tenders for the erection of a nine-story office building here for the Great West Permanent Loan Company, Ltd.

The Strong-Scott Mfg. Company, Winnipeg, is installing machine shops and foundry for doing manufacturing and repair work for flour mills.

The Kerrisdale Lumber Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of \$50,000 to carry on business as sawmill proprietor and timber merchant.

The Atlas Financial Corporation, Ltd., Vancouver, has been incorporated with a capital stock of \$250,000 to carry on business as sawmill proprietor, lumber and timber merchant.

The Dominion Sawmills Company, Ltd., Nelson, B. C., will erect a large mill to take the place of the Yale-Columbia mill which burned this spring.

The Empire Lumber Company, Ltd., Victoria, B. C., with a capital stock of \$7,500,000, is preparing to develop its 53,000 acres of timber land in the Cowichan district.

The Wheeler Osgood Company, Tacoma, Wash., has

secured a charter of incorporation in British Columbia to carry on a sash and door business.

The Canadian Puget Sound Lumber Company, Ltd., Victoria, B. C., is preparing plans for the new planing mill and sash and door factory to replace the plant burned recently.

Baltimore Industrial Notes

F. X. Ganter & Co. have filed plans for the erection of an addition to their plant at Leadenhall and Stockholm streets, 30 x 32 ft., three stories. It will be used for general manufacturing purposes.

The Water Board of the city is considering the question of installing a filtration plant in connection with its increased water supply from the Gunpowder River. The respective merits of mechanical and sand filtering plans are now being given attention.

The T. C. Bashor Company is very busy on orders in hand, but notes a rather light volume of new business, confined almost exclusively to smaller propositions. Negotiations for several sizable contracts are under way, and more active conditions are expected the coming month.

The John Boyle Company has filed plans for the erection of a two-story warehouse 115 x 240 ft. at 811 to 819 South Wolfe street. Moylan & Brother have the contract.

The Consolidated Gas, Electric Light & Power Company is planning extensive improvements and additions to its plant in the southern part of the city. Two buildings, one 115 x 188 and one 23 x 75 ft., the former one story and the later two stories, are to be erected.

Wallace Stebbins & Sons report that considerable estimating is being done, but contracts develop slowly. An order just closed covers two 50-hp. Fitzgibbons boilers for installation in Mt. St. Joseph College. The demand for engines is quiet.

Dietrich Brothers have recently taken contracts for a number of small and moderate sized structural steel buildings, including the Albion Hotel, a meter house for the Consolidated Gas, Electric Light & Power Company, and an addition to the Johns Hopkins Hospital. No large projects have recently been figured on, although there is a fair volume of business of the smaller character under estimate. Full time continues to be made at the plant.

Negotiations are still pending in connection with the establishment of a steel casting works, in which Pittsburgh parties are interested. Secretary Goldsborough, of the Factory Site Commission, reports several new projects under negotiation, information regarding which has not yet been made public.

Both the sewerage and the paving commissions of Baltimore are asking for proposals in connection with extensive work. Under contracts 29 and 30, for which bids are being taken by the Sewerage Commission, requirements include 17,800 ft. of 5-in. extra heavy cast iron soil pipe.

Riggs, Distler & Stringer, engineers, have a contract for a large amount of pipe work in connection with the present power and water system at the Springfield State Hospital at Sykesville, Md., where 4000 ft. of pipe will be laid and two 3000 gal. per min. turbine pumps installed. An order for a 100-kw. Ames-Westinghouse direct connected engine and generator and a 125-hp. boiler has been received from the Federal Finance & Construction Company for shipment to Louisville, Ky. General equipment orders have been fair and the outlook for business is more promising.

Crook, Kries & Co. are extremely busy in all departments. A number of good heating contracts have been taken, as well as considerable power equipment work, including a new converter for the Sherwood Distillery and three Edgemoor water tube boilers and four Ball Erie engines, two 50 and two 35-hp. direct connected with generator for modernizing the power plant of the Hotel Renner. Four Ball Erie engines with 100-kw. generators will be supplied the Monumental Brewery and a 350 cu. ft. per min. air compressor has been ordered by the State Hospital at Spring Grove, Md. A large amount of work in heating systems is also being figured on.

The Garage Construction Company has a contract to erect a one-story garage 50 x 156 ft. for M. Salmon, at Whitlock street and Callow avenue. It will provide for the storage of 50 automobiles.

Plans are out for a six-story addition 60 x 158 ft. to the Hotel Joyce. Theodore Pietsch is the architect and engineer. Steam heat, electric lighting and a battery of elevators are to be installed.

Trade Publications

Bending Brakes.—Dreis & Krump Mfg. Company, Chicago, Ill. Catalogue No. 12. Lists the various styles of brakes for handling cornices, boxes and pans and two power machines. An illustrated description of one of the latter appeared in *The Iron Age*, October 27, 1910.

Condensing Water.—Spray Nozzle Company, 291 Devonshire street, Boston, Mass. Bulletin No. 12. Gives general description and specifications for a spray cooling pond in which these nozzles are employed to break up the circulating water as it comes from engines and various pieces of machinery into a fine uniform spray.

Files.—Vixen Tool Company, 5001 Lancaster avenue, Philadelphia, Pa. Bulletin B. Lists the various types of Vixen files and shows the various cuts that can be furnished. Mention is also made of two universal tools mounted in cast iron holders which combine twelve tools in one.

Water Heaters and Circulating Pumps.—Alberger Pump & Condenser Company, 140 Cedar street, New York City. Bulletin No. 2. Illustrations and descriptive matter explain the operation of the Wainwright feed water and water heaters and the Alberger circulating pumps.

Gang Punching Machine.—Edwin B. Stimpson & Son, 31 Spruce street, New York City. Folder. Deals with the Defender power gang punch which is designed for cutting tab index cards and punching loose leaf ledger sheets.

Power Transmission Machinery.—Dodge Mfg. Company, Mishawaka, Ind. Catalogue No. C-12. Size, 6 x 9 in.; pages, 416. Pertains to the line of power transmission machinery made by this company, which includes couplings of various types, pillow blocks, belt tighteners, solid and split iron pulleys, spur and bevel gears, paper and iron friction gearing, rope transmission systems and belt conveyors.

Lubrication.—Chester Graphite Company, Chester Springs, Pa. Circular No. 13. Gives a general discussion of the advantages of flake graphite as a lubricant with special reference to the company's No. 300 oiled flake graphite.

Drop Forgings.—Lakeside Forge Company, Erie, Pa. Catalogue M. Shows an extensive line of drop forged wrenches, tool posts and parts, eye bolts and cranks, etc. Dimension tables with the various sizes of nuts handled by the wrenches are included.

Motor-driven Refrigerating Machinery.—General Electric Company, Schenectady, N. Y. Bulletin No. 4930. Devoted to the application of the electric drive to ice and refrigerating plants and illustrates the advantages offered by this method of drive as compared with steam power.

Tool Steel and Forgings.—McInnes Steel Company, Corry, Pa. Pamphlet. Pertains to the different articles manufactured by this company. The prices of various diameters and lengths of tool steel cylinders are given, followed by tables of the weights of various kinds of bar steel. Brief descriptions of the various brands of steel are given, followed by a list of extras.

Iron and Steel Cement.—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Catalogue No. 7. Describes a new Smooth-On product designed for concrete work. This is a hydraulic chemical iron cement prepared in powdered form and can be used alone or in combination with Portland cement or with Portland cement and sand.

Universal Joints.—Blood Brothers Machine Company, Kalamazoo, Mich. Folder. Illustrates several different styles of universal joints and shows their various parts.

Lubricating Grease.—Albany Lubricating Company, 708 Washington street, New York City. Two pamphlets. The first of these contains a practical talk on the subject of lubrication, followed by a brief description of the various brands of Albany grease. The other pamphlet shows a number of places where Albany grease is used for lubrication.

Ball Thrust Bearings.—S. K. F. Ball Bearing Company, 50 Church street, New York City. Bulletin No. 2. Points out the advantages of the company's self-aligning double-thrust ball bearing and its single-thrust bearings with or without a self-aligning seat.

Electric Fans.—Sprague Electric Works of the General Electric Company, 527 West Thirty-fourth street, New York City. Catalogue No. 325. Deals with a line of electric fans which are made for use on both direct and alternating current circuits in ceiling, desk, bracket, counter and floor column and exhaust types.

Molding Machines.—S. A. Woods Machine Company, Boston, Mass. Catalogue. Size, 6 x 9 in.; pages, 44. Refers to a complete line of inside molding machines for handling work ranging from 12 to 15 in. in diameter and 6 in. thick.

Vises and Blow-off Cocks.—Easton Tool & Machine Company, Easton, Pa. Catalogue No. B-5. Concerned with the Jackson line of vises which are made in a number of different styles and the Turney renewable plug and bushing blow-off cock, which was illustrated in *The Iron Age*, April 18, 1912.

Steam Turbines.—B. F. Sturtevant Company, Hyde Park, Mass. Catalogue No. 190. Describes a new type of turbine which is particularly adapted for direct connection with blowers, ventilating fans, gas exhausters, mechanical draft installations, electric generators, centrifugal pumps and other apparatus, for which efficient turbine speeds have been previously too high.

Grinding Machinery.—Wilmarth & Morman Company, Grand Rapids, Mich. Catalogue No. 93 and a pamphlet. The former covers a line of grinding machinery for drills, cutters, reamers, tools, lathe centers and surface grinding work, all of which are illustrated and briefly described. The pamphlet is a brief treatise on the company's lathe center grinding machine, which was illustrated in *The Iron Age*, November 19, 1910.

Power Transmission Appliances.—T. B. Wood's Sons Company, Chambersburg, Pa. Catalogue No. 55. Size, 6 x 9 in.; pages, 242. This catalogue supersedes all previous issues, and is concerned with modern and approved appliances for the transmission of power.

Valves.—Homestead Valve & Mfg. Company, Homestead, Pa. Catalogue. Contains illustrations and descriptive matter of the different designs of Homestead valves and gives considerable data on sizes and pressures.

Sheets and Tin Plate.—American Sheet & Tin Plate Company, Frick Building, Pittsburgh, Pa. A new edition of the pocket Reference Book. Contains valuable information relating to black, galvanized and roofing sheets and tin and terne plate, comprising an index of the products of the company, a full list of the specialties made, a full list of the company's different brands of bright and terne plate, tables of gauges, tables of weights of black and galvanized sheets, formed products and tin plate, instructions for constructing a tin roof, etc. The data given make the book exceedingly interesting to all users of sheets and tin plate and allied products. The advertising department of the company should be addressed for copies.

Gas Burners and Ovens.—Oven Equipment & Mfg. Company, New Haven, Conn. Catalogue. Size, 6 x 9 in.; pages, 56. Concerned with inclosed flame high efficiency gas burners; sectional and special ovens for enameling, japanning, baking, drying and bluing; automatic cut-off gas valves and other appliances.

Boring and Turning Mills.—H. Bickford & Co., Lakeport, N. H. Circular. Covers a line of vertical boring and turning mills which consists of four sizes ranging from 4 to 7 ft. in swing.

Bomb Calorimeter.—S. C. Dinsmore, 44 Buhl Block, Detroit, Mich. Catalogue No. 2. Describes the Atwater bomb calorimeter, which is built after a modification of the Berthelot principle, the change being a reduction in the amount of platinum used for lining the bomb and for supports and the use of substitutes which are satisfactory for commercial work.

Watertube Boiler.—Egbert R. Morrison, Sharon, Pa. Circular. Concerned with the Morrison boiler, which has a unique tube arrangement. With this boiler it is possible to remove any tube without injuring any other one and also without displacing the baffle or brick work.

Lathe and Grinding Machinery.—Conover-Overkamp Machine & Tool Company, Dayton, Ohio. Collection of loose leaf circulars. Show the various types of lathes built by this company with and without back gears and include tools having swings of 14 and 16 in. Mention is also made of a universal cutter and tool grinding machine which was illustrated in *The Iron Age*, July 13, 1911.

Electric Motors.—Wagner Electric & Mfg. Company, 6400 Plymouth avenue, St. Louis, Mo. Miniature bulletin No. 94. Gives general description and specifications for a unity power factor single-phase electric motor which was illustrated in *The Iron Age*, November 16, 1911.

Lubricating Pump.—Sterling Machine Company, Norwich, Conn. Bulletin No. 106. Describes the Sterling double system pump, which is designed for use in connection with continuous oiling systems, drawing the oil from the well or base of the engine and pumping it to the filter. After the oil has been filtered and cleaned, the other end of the pumps draws it back to the filter and forces it to the overhead storage tank or reservoir, from whence it flows by gravity to the various bearings of the unit to be lubricated.

Watchman's Clock.—Waite-Hayden Company, Syracuse, N. Y. Pamphlet. Refers to the Waite emergency alarm system, which consists of a night watchman's time recording clock with the various stations, an automatic fire alarm system including a master annunciator and a large electric horn, automatic and emergency annunciators for use through the plant, an automatic factory whistle blower and a bell-ringing system and an electric clock system which includes an eight-day master and one or more secondary clocks.

Turbo-Alternators.—Westinghouse Machine Company, East Pittsburgh, Pa. Circular WM No. 506. Points out the special features of the Westinghouse turbo-alternators and discusses the reaction and impulse types.

Water Pipes.—Michigan Pipe Company, Bay City, Mich. Pamphlet. Refers to an improved type of combination iron and wood water pipe and mine culm and acid pipe.

Bronze Products.—Damascus Bronze Company, Pittsburgh, Pa. Booklet. Deals with the various products of this company, which include nickel bronze, phosphor bronze bearing metal, bronze bearing metal, hot mill bearings, hydraulic and anti-acid bronzes, steam and bell metals, phosphorized copper and tin, silicon copper and Babbitt metal.

Steam Power Plant Equipment.—Steam Equipment Mfg. Company, Pittsburgh, Pa. Catalogue. Treats of a very complete line of material for power plants, the descriptions being supplemented by carefully tabulated and valuable engineering data.

Oil Filtration and Circulating Systems.—S. F. Bowser & Company, Inc., Ft. Wayne, Ind. Pamphlet. Illustrates and describes various types of systems for filtering and circulating lubricating oil in plants.

Electric Light and Insulating Joints.—Wirt Electric Specialty Company, Germantown, Philadelphia, Pa. Pamphlet and circular. The former is devoted to the Dim-a-Lite, which enables an incandescent lamp to be run at full candle power, 70 and 20 per cent. of its rated candle power and also very dim for night use. The circular calls attention to an insulating joint which is claimed to be very strong.

Steel, Iron and Machinery.—Scully Steel & Iron Company, Chicago, Ill. Catalogue. Size, 4 1/4 x 7 in.; 260 pages. This is a catalogue of iron, steel, machinery, heavy hardware, tools and supplies with valuable and accurate reference tables and is the company's complete catalogue for the present year, the monthly stock list having been discontinued. This book shows the various lines and gives the amount of each usually carried in stock. There is a complete index supplemented by a separate one for the different pieces of machinery and one for the classifications, tables of weights, etc., which occupy about 70 pages.

Turbine-Driven Pumps.—McEwen Bros., Wellsville, N. Y. Bulletin No. 1. Gives general description and specifications for a steam turbine driven pump which is built in several different sizes for drainage, emptying drydocks, water supply, circulating condenser water and serving cooling towers and hot wells, etc.

Heat Treating Furnaces.—Rockwell Furnace Company, 26 Cortlandt street, New York City. Bulletin No. 30. Contains a brief illustrated description of a line of over-fired heat treating furnaces using oil or gas as fuel. This furnace is particularly adapted for annealing brass, copper, German silver, steel tubing, wire, etc., and possesses the advantages of fuel economy, the production of a uniform temperature, low maintenance cost and small floor space.

Precision Measuring Instruments.—John M. Rogers Works, Gloucester City, N. J. Catalogue No. 8. This catalogue cancels all previous editions and is concerned with measuring instruments of precision, which include solid adjustable blade and solid reamers, adjustable blade hollow mills, adjustable thread cutting tools, steel mandrels, caliper and limit gauges, reference disks and thread gauges.

Steel Factory Equipment.—S. G. Arnold Company 571 West Van Buren street, Chicago, Ill. Collection of loose leaf circulars. Show a tool room or machine shop bench, and assembling or work table, steel stock shelving with or without drawers and oblique tumbling barrels.

Upright Drilling Machines.—Cincinnati Bickford Tool Company, Oakley, Cincinnati, Ohio. Catalogue. Gives general description and specifications for a line of heavy pattern upright drilling and tapping machines which are made with both stationary and sliding heads.

Screw Machine Products.—National-Acme Mfg. Company, Cleveland, Ohio. Leaflet and sample of work. Shows a piece of work which was sized, necked, milled on two sides, threaded and cut off from the bar in the time it took to form it. This was done in four positions, the piece being formed with side working tool in the first position and in the second the head and the body were sized and the neck cut with a shaving tool from the top slide. Two sides were milled with the attachment in the side position at the third stage and in the final position the piece was cut off from the bar.

Drop Forgings.—J. H. Williams & Co., 150 Hamilton avenue, Brooklyn, N. Y. Catalogue. Size, 6 x 9 in.; pages, 134. Treats of the various kinds of iron, steel, copper, bronze and aluminum drop forgings made by this company for various purposes. These include wrenches of all types, spanners, safety lathe and milling machine dogs, caliper gauges, crank handles, tool post fittings, eye bolts, swivels, hooks, pipe fittings and wrenches, crank shafts and connecting rods.

Jackhammer.—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 4021. Describes and illustrates the type BCR-No. 43 jackhammer, which is a type of hand hammer drill designed to operate with either steam or air for drilling down holes of average size and depth. It is automatically operated and is equipped with a butterfly valve. The drill has a 2 1/4-in. diameter cylinder with a 2-in. stroke and uses 3/4-in. hollow hexagon drill steel. Its weight is 40 lb.

Air Compressors and Rock Drilling Machinery.—Sullivan Machinery Company, 122 South Michigan avenue, Chicago, Ill. Two bulletins and a booklet. No. 58K, replacing No. 58G, deals with power and steam driven air compressors. The construction of these compressors is described at length and the text is supplemented by engravings of the machines, their various parts and places where they have been installed. No. 66F pertains to a light weight rock drilling machine which is designed to be used by one man instead of two. The special features of this drill are a notable economy in labor and a reduction in the amount of waste which has to be broken and handled to extract the ore. Booklet No. 108 aims to remind the contractor whose work includes rock excavation of the equipment made for that purpose by this company.

